THE TRANSACTIONS OF THE ENTOMOLOGICAL SOCIETY OF LONDON

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I. *Monograph of British* Braconidæ. Part I.

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[Read March 4th, 1885.]

Plates I.—VI.

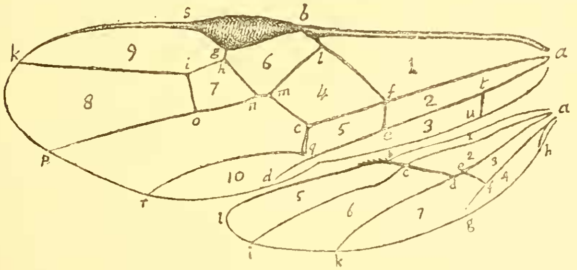
The object of the present work is to furnish entomologists with short but sufficient descriptions of our native *Braconidæ*. Since the publication of Haliday's admirable "Essay on the classification of Parasitic Hymenoptera," &c., in the 'Entomological Magazine,' nothing in a connected form has been attempted on this subject, and the want of some manual comprising recent discoveries has no doubt been mainly the cause of the indifference with which British collectors have treated this group of insects. The discoveries of the last fifty years, both in new species and in the biology of those previously known, are so numerous and interesting that they cannot fail, if conveniently presented, to attract a considerable class of observers. The number of lepidopterists who breed their specimens is very large, and contains many men of inquiring minds who would gladly know something of the curious parasites that so often frustrate their labours; while the advantage which would accrue to entomological science from the assistance of such a host of well-placed observers has often been pointed out.

A minute account of the anatomy and physiology of these insects is beyond the scope of the present essay, and must be sought in the works of Gravenhorst, Nees von Esenbeck, Curtis, Westwood, &c. But such particulars as are necessary to distinguish the *Braconidæ* from other parasitic Hymenoptera, and to understand their descriptions, may here be concisely stated.

The *Braconidæ*, Ichneumones adsciti, or supplementary Ichneumons, are closely related, in structure and habits, to the genuine Ichneumons. They consist of about twenty-six groups or subfamilies, connected by a few common characters, and yet so widely separated by others as to show that links in the series are missing, and to render their linear arrangement impracticable. They are, however, all distinguished from the true Ichneumons by wanting the *exterior discoidal transverse nervure* in the fore wings; and by having the *first cubital areolet* generally, though not always, separated from the *prædiscoidal*; in the Ichneumons these two areolets are never distinct. With the exception of one subfamily, the *Aphidiides*, they are further remarkable for the absence of a real articulation between the 2d and 3d abdominal segments. In the language of Strauss Durckheim, these two segments are united either (1) by *juxtaposition* without imbrication, in which case a suture is visible, but there is no joint to permit the flexure of the abdomen; or (2) by *coalition*, the segments being soldered together, without any trace of a suture, and equally without power of movement. When the junction of these two segments is visible, it is called the *suturiform articulation*. In many descriptions (as in those of *Microgaster* by Wesmael) the 2d and 3d segments are spoken of as one; but this is inconvenient, and is not here adopted. The *suturiform articulation* affords the means of referring to the *Braconidæ* certain forms like *Dimeris* and *Chasmodon*, which, having no wings, would not otherwise be easily recognised. Imperfect articulation of the segments is further developed in some of the subfamilies, and reaches its maximum in the *Chelonides*, most of which have the three segments that are visible from above soldered together. The *Aphidiides*, on the contrary, have all the segments loosely articulated, and are able to bend the abdomen beneath them so as to project beyond the head, on which account they have been called *Flexiliventres*; their wings, however, sufficiently distinguish them from the true Ichneumons. I have placed them last on account of differences which forbid their being approximated to any other group. It is not quite certain whether they should not constitute a primary division equal in value to the rest of the *Braconidæ*.

The neuration exhibits much greater variety than that of the Ichneumons, and its value in generic division is consequently higher. The technical terms necessary for this important part of the subject must now be explained.

HORISMOLOGY OF WINGS OF THE BRACONIDÆ.



FORE WING.

Areolets.	*Longitudinal Nervures.*	*Transverse Nervures.*
1. præbrachial.	*ab.* costa and subcosta united.	*hn.* 1st intercubital.
2. pobrachial.	*afc.* præbrachial.	*io.* 2d ,,
3. axillary, sometimes divided.	*aed.* pobrachial.	*cm.* interior discoidal, or recurrent.
4. prædiscoidal.	*ghik.* radius.	*lf.* præbrachial transverse.
5. podiscoidal.	*gh.* 1st abscissa.	*fe.* pobrachial transverse.
6. 1st cubital.	*hi.* 2d ,,	*tu.* axillary transverse.
7. 2d ,,	*ik.* 3d ,,	
8. 3d ,,	*lmnop.* cubitus.	
9. radial.	*qr.* anal.	
10. anal.	*sk.* metacarpus.	

HIND WING.

Areolets.	*Longitudinal Nervures.*	*Transverse Nervures.*
1. costal.	*ab.* costal (obsolete).	*ed.* præbrachial.
2. præbrachial.	*acb.* subcostal.	*ef.* pobrachial.
3. pobrachial.	*aed.* præbrachial.	
4. anal.	*afg.* pobrachial.	
5. radial.	*bl.* metacarpus.	
6. cubital.	*ci.* radius.	
7. discoidal.	*dk.* cubitus.	
8. axillary.	*ah.* anal.	

In descriptions the wings are supposed to be extended at right angles to the body, as in flight. Between the costa and subcosta lies the *costal areolet*, which in the fore wing is contracted to a vanishing point by the junction of the two nervures; in the hind wing it is distinct, although open above, the costa being obsolete. The enlargement at *b*, just before the stigma, formed by the ends of the costa and subcosta, is the *parastigma*. The recurrent nervure, or interior discoidal, is called *interstitial* when the point *m* coincides with *n*; *rejected*, when it falls into the 1st cubital areolet (as in the fig.); and *erected*, when it falls into the 2d. Similarly the pobrachial transverse is interstitial when it joins the præbrachial at the point *f*; and the anal nervure, when the point *g* coincides with *c*. In the hind wing the radial areolet is *petiolated* when it is remote from the præbrachial; and *contiguous*, when the two areolets touch at the point *c* (as in the fig.); near *b* is a row of several small hooks by which the wings are united during flight.

The number of species in which the wings are undeveloped is small in the *Braconidæ*, compared with the other parasitic groups of Hymenoptera. The apterous species known are the female *Pambolides*, *Spathius pedestris*, Wesm., ♀, *Chasmodon apterus*, Nees, ♂ and ♀; the species with abbreviated wings are *Ganychorus ambulans*, Hal., *G. aptenodytes*, Marsh., *Panerema inops*, Först., and *Diaspasta contracta*, Hal.

In counting the joints of the antennæ, the minute 1st joint, or *radicle*, immersed in the head, is to be disregarded. The 1st joint will therefore be the *scape* (of authors); generally long and stout. This is succeeded by what appears to be a very short joint, but in reality consists of two, soldered together; these two, for the sake of convenience, are reckoned as one, in accordance with the method originated by Gravenhorst, and followed by Wesmael, Haliday, and others.

It may be useful to define a few terms of frequent occurrence in descriptions.

The *face* is that portion of the front of the head which lies between the antennæ, the clypeus, and the eyes.

The *front*, or forehead, extends from the antennæ to the foremost ocellus.

The *vertex* is the space between the foremost ocellus and the *occiput* (the concave, vertical, hinder surface of the head), and is bounded on either side by an imaginary line drawn from the inner margin of the eye.

The *stemmaticum* is the space on the vertex (generally triangular), in which the ocelli are situated.

The *genæ*, or cheeks, are the sides of the head between the eyes and the occiput, and are limited above by the vertex.

The parts of the body in general are formed as in the *Ichneumonidæ.* The head varies greatly in shape from the very broad short head of *Microctonus boops* to the elongate suborbicular head of *Histeromerus mystacinus.* The antennæ with rare exceptions are filiform or setaceous (clavate in *Rhopalophorus clavicornis* and *Aspidogonus diversicornis*) and multiarticulate; the number of joints ranging from 10 in *R. clavicornis* and *Trioxys brevicornis*, or 11 in several species of *Trioxys* and *Ephedrus*, and in *Chremylus rubiginosus*, ♂, to upwards of 60 in many *Rhogadides*, reaching to 71 in *R. procerus.* The antennæ are mostly unicolorous, but are ringed with white in *Heterogamus dispar*, ♀, and *Helcon annulicornis*, ♀, white at the base in *Perilitus albicornis*, ♀, and pale in several species. In a few cases they are hairy (*Aspidogonus diversicornis* and *Microctonus plumicornis*) and occasionally geniculate (*Streblocera*, *Eutanycerus*, and *Rhopalophorus*). The antennæ of the females are shorter, stouter, and usually with fewer joints, than those of the males. The number of joints is determinate in a few groups, as the *Microgasterides* and *Blacides*; more commonly it varies to a small extent, even in individuals of the same species. The disk of the mesothorax commonly exhibits a trilobed appearance, being divided by two superficial furrows converging towards the scutellum. The 3 lobes correspond with large interior bundles of muscles, and their external appearance or absence should be noticed. The sculpture of the metathorax is often an important character. Sometimes it is divided by one or more carinæ or raised lines into compartments, but less regularly than in the Ichneumons. The first abdominal segment is either petiolated, subsessile, or sessile, smooth or rugulose: the legs are like those of the Ichneumons, the trochanters are biarticulate, and all the tarsi 5-jointed. The terebra is of variable length, either entirely concealed, as in *Chelonus*, or longer than the body, as in *Vipio. Bracon penetrator*, Smith, from Japan (which, however, is not a true Bracon) has the body $\frac{3}{4}$ inch long, while the terebra attains the extraordinary length of $6\frac{3}{4}$ inches.

Great pains have been taken to collect information respecting the parasitism* of these insects. A number of bred specimens, amounting to some hundreds, has been kindly contributed by various entomologists, Bignell, Billups, Bridgman, Cameron, Fitch, J. E. Fletcher, W. H. B. Fletcher, and others. In all such cases no labour has been spared to identify species correctly. The names of lepidopterous victims are taken from 'The Entomologist Synonymic List of British Lepidoptera,' by R. South, London, 1884. For notes and references derived from published works, as those of Ratzeburg,

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* Parasitism is a somewhat vague term, but may be divided into the *incomplete*, as that of the cuckoo, &c., and the *complete*, as in the case of hymenopterous insects. A complete parasite is an animal which lives inside or upon the body of another larger than itself, devouring its substance and causing it to perish. The Ichneumons in general are well known to be internal parasites; yet Brischke's observation respecting *Oncophanes* reported by Ratzeburg and to some extent confirmed by Bignell, tends to the conclusion that at least some of the *Braconidæ* are external complete parasites. Whatever doubt may be considered to attach to this circumstance, we must hesitate still more to receive the accounts published of the occurrence of *Braconidæ*, otherwise known to be parasites of Lepidoptera, among spiders' eggs. These are minute bodies, and any larger insect preying upon them must be external, and must devour many; in which case it is no more a parasite than any other carnivorous creature. Hence Brischke's statement that he has bred the large *Microgaster deprimator*, Nees, from spiders' eggs, seems inadmissible. Ruthe conjectured the same *Microgaster* to be a parasite of *Bombus terrestris*, L. It is hard to believe that whereas the other larvæ of the genus are so organised as to breathe and live by suction within the body of a caterpillar, surrounded by humidity and protected from atmospheric influence, this one alone should live in the spider's nest exposed, preying upon eggs, without being subject to the conditions of parasitism. *Pezomachus*, however, may readily be quoted as a received example of an Ichneumon bred from spiders' eggs; in which case it must be an external feeder, and not a true parasite. It is, however, much more commonly and certainly obtained from the cocoons of *Microgaster*, being then distinctly an internal parasite. The history of *Pezomachus* is not yet cleared up, nor can we deny (whatever difficulty may exist) that it has proceeded from spiders' nests. It behoves future observers, however, to make very sure that the supposed spider's nest is the genuine work of an araneid, and to verify the species. For *Apanteles congestus*, Nees, and other Microgasterids make nests of cocoons which have often been mistaken for the work of spiders, and the breeding of *Pezomachus*, *Hemiteles*, &c., from these is a common occurrence.

Brischke, Giraud, &c. (where no means of verification exist) the present writer cannot be responsible; they are quotations which depend upon the authority of others. They have, however, been as far as possible scrutinised, and many rejected as being, from different causes, inadmissible, or the reasons for disputing their accuracy have been stated.

In the identification of minute similar species, it is, as a general principle, safer and easier to trust to good descriptions than to the inspection of preserved specimens. In many cases, however, the value of types is indisputable, and large resources of this kind are available to the enquirer. The general collections of Stephens and Ruthe are in the British Museum, together with types of *Aphidiides* and *Microgasterides* deposited by Haliday. The Hope Museum at Oxford contains many named specimens from Wesmael and Förster, to which were added, in 1884, some of Haliday's from Trinity College, Dublin. Gravenhorst's collection still exists at Breslau; that of Nees von Esenbeck at Bonn, in small glazed boxes; Wesmael's at Brussels; Van Vollenhoven's at Leyden; Förster's remains in Europe unsold, while that of Curtis is less conveniently placed in Australia.

The earliest arrangements of the *Braconidæ*, those of Nees von Esenbeck and Haliday, were based upon the palpary system, and of them it is unnecessary to say more than that they exhibit in a high degree the disadvantages of that method. Haliday's system, published in the 'Entomological Magazine' (vol. i., pp. 261—266), still has its value as a remarkable collection of acute observations, but fails as a linear arrangement; insects of the same genus, owing to the arithmetic of the palpi, being found in widely different places; the group of *Dacnusa*, e. g., appears no less than four times over. The Generic Synopsis of the same author, appended to vol. ii. of Westwood's "Introduction," supplies no general system, but gives only brief outlines of the genera. Wesmael, unacquainted with Haliday's writings, divided the *Braconidæ* into three principal groups. I. *Cylostomi*. These have the clypeus notched or emarginate on its lower edge, and the labrum so withdrawn as to form a sort of palate to the oral aperture; the mandibles are too short to cross each other, but, only touching at the points, they form, with the clypeus, a somewhat circular opening. II. *Clidostomi*. The clypeus is not, or hardly, emarginate, but rounded or produced; the mandibles cross each other at the points, and the mouth appears closed, or the aperture left is very small. III. *Exodontes.* The mandibles are not only too short to meet at the points, but they are curved outwards on each side of the head, unlike those of any other insects, and useless for every purpose to which such organs can be applied. These divisions, however, are insufficient for the extent of the subject, and the second is a jumble of dissimilar forms, being nothing else than the remainder after the subtraction of the first and third. The more recent system of Förster (Verh. pr. Rheinl., 1862, pp. 225—288) embodies everything of value in the works of his predecessors, arranged in an order of his own, founded upon the general appearance of the animals, and in that respect perhaps as satisfactory as the subject permits. There exists another variation of this system, published by Reinhard in Taschenberg's Hym. Deutschlands, 1866, pp. 78—91. This, being written to suit the plan of a special work, deals chiefly with genera, arranged in a different sequence from that of Förster; for higher divisions recourse must be had to the latter writer. His synoptical table has been severely criticised, and is undoubtedly liable to many objections, not the least of which is that the difficulty of its application is very deterring to beginners. In the following attempt at simplification, we shall depart in some respects from the German method. The divisions termed by Förster *subfamilies* are those chiefly to be attended to, as they are, or are supposed to be, founded upon nature, and of equal value. The other headings, taken from Wesmael and Haliday, are here only used as guide-posts, and for the purpose of catching the eye. Excluding Förster's *Pachylommatoidæ*, as belonging to the *Evaniidæ*, we will treat the *Braconidæ* under six divisions, each including a number of subfamilies.

(10) 1. Suturiform articulation rigid, connate.

(9) 2. Mandibles in the usual position, touching or crossing at the points.

(4) 3. Clypeus emarginate, forming with the mandibles a semicircular opening .. I. Cyclostomi.

(3) 4. Clypeus not so emarginate, fitting closely to the mandibles.

(6) 5. Abdomen above without sutures, segments 1—3 forming a solid shield; or with 2 superficial sutures at most, but still exarticulate .. .. II. Cryptogastres.

(5) 6. Abdomen showing the usual sutures.

(8) 7. Second cubital areolet minute, as in the *Ichneumonidæ*, often imperfect .. III. Areolarii.

(7) 8. Second cubital areolet large, quadrangular, or wanting .. .. IV. Polymorphi.

(2) 9. Mandibles with the points turned outwards .. .. V. Exodontes.

(1) 10. Suturiform articulation, as well as the rest, flexible, allowing the abdomen to be curved forwards under the thorax.. VI. Flexiliventres.

I. Cyclostomi, *Wesm.*

(4) 1. Occiput not margined, or only faintly at the sides.

(3) 2. Pobrachial areolet as long as the præbrachial .. .. 1. *Braconides.*

(2) 3. Pobrachial areolet shorter than the præbrachial .. .. 2. *Exothecides.*

(1) 4. Occiput margined, distinct from the vertex.

(6) 5. Abdomen petiolated .. .. .. 4. *Spathiides.*

(5) 6. Abdomen sessile or subsessile.

(10) 7. Fore wings with 2 cubital areolets; or the ♀ apterous.

(9) 8. Head cubical; abdominal segments discrete; ♀ winged; hind wings of ♂ with a stigma .. .. 5. *Hecabolides.*

(8) 9. Head transverse; abdominal segments after the 1st connate; ♀ often apterous; hind wings of ♂ without a stigma .. 6. *Pambolides.*

(7) 10. Fore wings with 3 cubital areolets.

(12) 11. Head cubical, not contracted behind the eyes .. .. 7. *Doryctides.*

(11) 12. Head transverse, more or less contracted behind the eyes.

(14) 13. Anal nervure interstitial .. .. .. 8. *Hormiides.*

(13) 14. Anal nervure falling into the podiscoidal areolet.

(16) 15. Abdomen subpetiolated, nearly smooth; terebra elongate; thyridia of segments 2—3 invisible; small gnat-like species 3. *Rhyssalides.*

(15) 16. Abdomen sessile, almost always rugose, except the apex; terebra concealed or short; thyridia of segments 2—3 visible; large robust species .. .. .. 9. *Rhogadides.*

II. CRYPTOGASTRES, *Wesm.*

(2) 1. Fore wings with 2 cubital areolets; belly concave from end to end, with sharply defined edges .. .. 10. *Sigalphides.*

(1) 2. Fore wings with 3 cubital areolets; belly concave; edges reflexed; body rugose 11. *Chelonides.*

III. AREOLARII, *Wesm.*

(2) 1. Mesothoracic sutures invisible; radial areolet ample, reaching the apex of the wing .. .. 12. *Microgasterides.*

(1) 2. Mesothoracic sutures distinct; radial areolet minute, remote from the apex of the wing .. .. 13. *Agathidides.*

IV. POLYMORPHI,* *Wesm.*

(4) 1. Abdomen petiolated.

(3) 2. Fore wings with 2 cubital areolets .. 14. *Euphorides.*

(2) 3. Fore wings with 3 cubital areolets .. 15. *Perilitides.*

(1) 4. Abdomen sessile or subsessile.

(10) 5. Fore wings with 2 cubital areolets.

(7) 6. Axillary areolet of the fore wings closed 16. *Calyptides.*

(6) 7. Axillary areolet of the fore wings open.

(9) 8. Radius straight, its first abscissa long, distinct; terebra ♀ straight .. .. 17. *Blacides.*

(8) 9. Radius curved, its first abscissa short, subobsolete; terebra ♀ decurved .. 18. *Liophronides.*

(5) 10. Fore wings with 3 cubital areolets.

(12) 11. Radial areolet very short, the metacarpus not longer than the stigma .. .. 19. *Ichneutides.*

(11) 12. Radial areolet elongate, the metacarpus longer than the stigma.

(14) 13. Hind femora incrassated, sometimes toothed; head subquadrate, vertex excavated, the fovea containing the middle ocellus .. .. 20. *Helcontides.*

(13) 14. Hind femora simple; head transverse, vertex not or hardly excavated, the middle ocellus not placed in a fovea.

(16) 15. Abdomen linear, longer than the thorax 21. *Macrocentrides.*

(15) 16. Abdomen ovate, not longer than the thorax.

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* Wesmael's division *Polymorphi*, containing heterogeneous groups, has rightly been objected to as unscientific. Its use here is merely to indicate the subfamilies which do not enter into any of the other divisions.

(18) 17. Occiput margined, distinct from the vertex; axillary areolet with an incomplete transverse nervure .. .. .. 22. *Diospilides.*

(17) 18. Occiput not margined; axillary areolet with no vestige of a transverse nervure 23. *Opiides.*

V. Exodontes, *Wesm.*

(2) 1. Fore wings with 3 cubital areolets (rarely apterous or subapterous) .. .. 24. *Alysiides.*

(1) 2. Fore wings with 2 cubital areolets .. 25. *Dacnusides.*

VI. Flexiliventres, *Hal.*

Hind wings with only 2 longitudinal nervures; præbrachial areolet often incomplete; pobrachial areolet wanting 26. *Aphidiides.*

I. CYCLOSTOMI.

I. BRACONIDES.

As regards British species, the characters coincide with the single genus

Bracon, *Fab.*

Fab., Piez., 102 (1804); Wesm., Mém. Ac. Brux., 1838, p. 7; Först., Verh. pr. Rheinl., 1862, p. 235.

Mandibles bidentate, touching at the points, and enclosing, with the emargination of the clypeus, a somewhat circular opening. Maxillary palpi 5-, labial 3-jointed. Antennæ with a variable number of joints, even in the same species, from 14 (♀) to upwards of 40 (♂ ♀); 3d joint longer than the 2d. Occiput not margined. Mesothoracic sutures distinct. Metathorax not areated, sometimes carinated. Abdomen sessile, with 7 visible segments. Suturiform articulation distinct, sinuated or straight. Terebra ♀ exserted, of variable length. Cubital areolets 3, the 2d trapezoidal; recurrent nervure rejected; præbrachial and pobrachial areolets of equal length; pobrachial areolet of the hind wings minute.

The second subfamily, *Exothecides*, is closely allied, and was only separated by Förster as an afterthought, at the end of his Generic Synopsis, *lib. cit.*, p. 279. In the *Exothecides* the pobrachial transverse nervure is evected, whereby the pobrachial areolet becomes longer than the præbrachial. The genus *Cœloides*, Wesm., is easily mistaken for *Bracon*, having the pobrachial transverse nervure similarly interstitial; but the occiput is margined, the 3d joint of the antennæ is not longer than the 2d, and the front is deeply excavated above the antennæ,—characters which suffice to relegate it to *Doryctides*.

Förster's genus *Iphiaulax*, Verh. pr. Rheinl. 1862, p. 234, contains a few European and many exotic forms, separated from *Bracon* on the ground that their abdomen is marked by several oblique or transverse impressions. It is here mentioned because *I. impostor*, Scop., Ent. Car., 287, the *B. denigrator*, Fab., Piez. 109, a species of Southern Europe, has been wrongly supposed to be British. The mistake originated in confusing three different insects, *B. denigrator*, L., *B. denigrator*, Fab., and *Proterops nigripennis*, Wesm. Only the last is British, and to it must be referred the figure given by Curtis, B. E., lxix, and the specimen existing in the cabinet of Stephens.

The *Braconides* constitute a group of great and unknown extent in tropical regions, embracing the largest and most highly coloured of the Ichneumones adsciti. Some of these are also found in Southern and Central Europe, but in our climate none of the superior forms occur. The small British species have been totally neglected by our writers; the number of them is not yet ascertained; their determination is difficult; their transformations and parasitism very imperfectly understood. The facts we have collected tend to show that they infest in their earlier stages insects of several different orders, Coleoptera, Hymenoptera, Lepidoptera, and Diptera. Their motions are slow, and their flight feeble, notwithstanding an ample provision of wings. They generally lurk in shady places, resorting occasionally, during the hours of sunshine, to umbelliferous flowers, for the purpose of basking or feeding. Their predominant colour is black, often diversified with rufous or yellowish markings; some, however, are almost wholly testaceous. Those with dark wings uniformly exhibit underneath the stigma a whitish angulated streak, ending in a spot, which often renders some of the nervures, and especially the 1st intercubital, decolorous. The males are not easily identified when separated from their partners: they are usually smaller, with longer antennæ, and exhibit the specific characters with less distinctness.

Nees v. Esenbeck (Mon., i., pp. 49–126) described 80 European species of his genus *Bracon*, divided into four sections, of which the last alone contains genuine species according to modern views. Of the 54 therein comprised, 3 belong to *Vipio*, Latr., and several more to *Iphiaulax*, Först., *Neoneurus*, Hal., *Cœloïdes*, Wesm., *Doryctes*, Hal., and *Dendrosoter*, Wesm. The number of real Bracons remaining is not easily ascertained, but it is very nearly as follows: spp. 27—50, and probably spp. 66, 69, 70, 73 and 74, making 30; several of these, however, evidently comprise different insects under the same name. Wesmael (Nouv. Mém. Ac. Brux., 1838, pp. 10—57) described 48, of which all but the first (*nominator*, Fab.) are genuine. Of these 47, 14 are supposed to be reproductions of the Neesian species, including varieties with fresh names; so that the actual additions made by Wesmael are reduced to 33. Of his 47 species, 25 are here introduced as British, with 1 from Nees, 2 from Ratzeburg, and 10 new, making 38. The material at our disposal, brought together by the kindness of contributors whose names are hereinafter recorded, is considerable; but there can be no doubt that many more native species remain to be discovered.

Table of Species.

I. Second cubital areolet distant from the exterior margin by twice its length, measured along the cubitus; anterior side shorter than the interior.

(2) 1. Abdomen punctulato-rugulose; antennæ, ♀ 25-, ♂ 27-jointed, longer than the head and thorax .. .. 9. *stabilis*, Wesm.

(1) 2. Abdomen smooth; antennæ, ♀ 14—17-, ♂ 20—26-jointed, not longer than the head and thorax .. .. 10. *brevicornis*, Wesm.

II. Second cubital areolet distant from the exterior margin by about its own length, measured along the cubitus; anterior and interior sides subequal, or the anterior longer.

Section i. Segments 1—4, or more, or all the segments, sculptured; rugulose, aciculated, or punctulate.

(12) 1. Suturiform articulation sinuated.

(9) 2. Metathorax not carinated, or with only an inchoate carina at the apex.

(4) 3. Abdomen, after segment 1, wholly testaceous 2. *lætus*, Wesm.

(3) 4. Abdomen, after segment 1, not wholly testaceous; partly black.

(6) 5. Wings blackish; stigma black; terebra ♀ as long as the body .. .. 4. *minutator*, Fab.

(5) 6. Wings hyaline; stigma pale; terebra ♀ shorter than the body.

(8) 7. Antennæ ♂ 29-jointed; terebra ♀ as long as the body; stigma fusco-testaceous .. .. 1. *pectoralis*, Wesm.

(7) 8. Antennæ ♂ 40-jointed; terebra ♀ much shorter than the body; stigma luteous 3. *erythrostictus*, n. s.

(2) 9. Metathorax carinated from base to apex.

(11) 10. Head and thorax black; coxæ black; 4 posterior femora more or less black 6. *longicollis*, Wesm.

(10) 11. Head and thorax partly testaceous; coxæ testaceous, often with a black spot; 4 posterior femora testaceous 5. *fulvipes*, Nees.

(1) 12. Suturiform articulation straight.

(14) 13. Head and thorax varied with testaceous; terebra ♀ $\frac{1}{2}$ abdomen .. .. 7. *variegator*, Nees.

(13) 14. Head and thorax entirely black; terebra ♀ $\frac{1}{4}$ abdomen .. .. .. 8. *nigratus*, Wesm.

SECTION ii. Segments* 1—3 sculptured; the rest smooth.

(2) 1. Abdomen conspicuously black and testaceous .. .. 11. *erraticus*, Wesm.

(1) 2. Abdomen black, except the narrow margins of segment 1, or 1—2.

(4) 3. Metathorax carinated (sometimes subobsoletely); suturiform articulation straight .. .. 21. *Satanas*, Wesm. ♂.

(3) 4. Metathorax not carinated; suturiform articulation sinuated .. .. .. 12. *exarator*, n. s.

SECTION iii. Segments 1—2 sculptured; the rest smooth.

(4) 1. Wings blackish, or fuscous.

(3) 2. Abdomen testaceous, with or without a few round discal spots .. .. 13. *triangularis*, Nees.

(2) 3. Abdomen black, testaceous at the base and sides .. .. 14. *Roberti*, Wesm.

(1) 4. Wings hyaline, or only slightly infuscated.

(6) 5. Disk of the mesothorax, partly or entirely, testaceous .. .. .. 15. *lævigatus*, Ratz.

(5) 6. Disk of the mesothorax black.

(12) 7. Abdomen testaceous in the middle, black at the base and apex.

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* *Cf.* sp. 16, *B. mediator*, Nees, ♂.

(9) 8. Coxæ rufo-testaceous .. .. 16. *mediator*,* Nees.
(8) 9. Coxæ black.
(11) 10. Femora and tibiæ infuscated .. 17. *Vectensis*, n. s.
(10) 11. Femora and tibiæ testaceous .. 18. *fuscicoxis*, Wesm.
(7) 12. Abdomen black in the middle, often bordered with testaceous; or entirely black, except the narrow margins of segments 1—2.
(16) 13. Abdomen black, bordered with testaceous at the base and sides.
(15) 14. Femora testaceous .. .. .. 27. *discoideus*, Wesm., var.
(14) 15. Femora chiefly black .. .. 19. *tornator*, n. s.
(13) 16. Abdomen entirely black, except the narrow margins of segments 1—2—(3).
(18) 17. Segment 2 with a yellowish dot on the lateral margins .. .. 20. *guttiger*, Wesm.
(17) 18. Segment 2 without a yellowish dot on the lateral margins.
(20) 19. Metathorax carinated .. .. 21. *Satanas*, Wesm., ♀.
(19) 20. Metathorax not, or very incompletely, carinated.
(24) 21. Femora testaceous.
(23) 22. Terebra less than ½ abdomen .. 22. *fraudator*, n. s.
(22) 23. Terebra ⅔ abdomen .. .. .. 23. *epitriptus*, n. s.
(21) 24. Femora black.
(26) 25. Segment 2 rugulose only at the base; wings subhyaline .. .. 24. *larvicida*, Wesm.
(25) 26. Segment 2 entirely rugulose; wings infumated .. .. 25. *prætermissus*, n. s.

Section iv. All the segments smooth.

(24) 1. Tarsi simple, not incrassated.
(7) 2. Palpi testaceous.
(4) 3. Abdomen entirely black, except the narrow margins of segments 1—2, not easily seen .. .. .. 26. *colpophorus*, Wesm.
(3) 4. Abdomen not entirely black, partly and conspicuously testaceous.
(6) 5. Abdomen black in the middle, bordered with testaceous .. .. 27. *discoideus*, Wesm.
(5) 6. Abdomen testaceous in the middle, black at the base and apex .. 28. *regularis*, Wesm.
(2) 7. Palpi blackish.
(9) 8. Wings hyaline; terebra ♀ longer than the body .. .. .. 29. *caudatus*, Ratz.
(8) 9. Wings fuscous or fuscescent; terebra ♀ shorter than the body, except in sp. 37, *atrator*, Nees.

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* The ♂ of *B. mediator*, Nees, often has the 3d segment rugulose, and so belongs to Section ii.

(13) 10. Legs testaceous, rarely with some black portions.

(12) 11. Abdomen* black, testaceous at the sides; terebra ♀ ¼ abdomen .. 30. *terebella*, Wesm,

(11) 12. Abdomen testaceous, only segment 1 black; terebra ♀ more than ¾ abdomen .. .. 31. *otiosus*, n. s.

(10) 13. Legs black; tibiæ sometimes testaceous at the base.

(17) 14. Segments 2—7 black and testaceous.

(16) 15. Suturiform articulation straight; terebra ♀ as long as the abdomen 32. *variator*, Nees.

(15) 16. Suturiform articulation sinuated; terebra ♀ ⅓ abdomen .. .. 33. *degenerator*, n. s.

(14) 17. Segments 2—7 entirely black, except the margins of segments 1—2.

(21) 18. Terebra ♀ shorter than the abdomen.

(20) 19. Length, 1⅓ lin.; antennæ ♀ 25—27-jointed .. .. 34. *osculator*, Nees.

(19) 20. Length, ½—1 lin.; antennæ ♀ 20—22-jointed .. .. 35. *obscurator*, Nees.

(18) 21. Terebra ♀ longer than the abdomen.

(23) 22. Terebra ♀ as long as the thorax and abdomen .. .. 36. *anthracinus*, Nees.

(22) 23. Terebra ♀ longer than the body .. 37. *atrator*, Nees.

(1) 24. Tarsi incrassated, especially the 4 posterior .. .. 38. *barypus*, n. s.

1. *Bracon pectoralis*, Wesm.

Braco pectoralis, Wesm., Nouv. Mém. Ac. Brux., 1838, p. 12, ♂ ♀.

Testaceous; antennæ and pectus black; abdomen above wholly rugulose; suturiform articulation wide, deeply crenate, strongly bisinuated; wings subhyaline; terebra ♀ about as long as the body. ♂ ♀. Length, 1¼—1½; exp. of wings, 3½ lin.

Var. 1, ♀. Mesothorax, metathorax, and abdomen at the base, varied with black.

Var. 2, ♂. Occiput, thorax above and beneath, metathorax, and scutum of 1st abdominal segment, black; scutellum and a discal patch on the mesothorax pale testaceous; segments 2—3 in the middle indeterminately, and all segments after the 4th, fuscous; stigma fusco-testaceous; legs pale, 4 anterior tarsi at the apex, and hind tarsi entirely, fuscous.

The only English specimen at hand is a ♂ belonging to var. 2. Antennæ 29-jointed. Palpi testaceous. Metathorax smooth. Abdomen oval, shorter than in most males of this genus; segments

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* A var. of *B. terebella*, Wesm., has the abdomen entirely testaceous.

1—3 more coarsely sculptured than the rest; segment 1 black, not shining, much depressed in the middle, the margins elevated; sides beyond the scutum testaceous; segments 2—3 with a medial fuscous blotch, in which the rugosity is most apparent. According to Wesmael, the stigma is rather vaguely defined on its inner edge, especially towards the base, owing to the absence of a nervure in that place. More specimens might perhaps elucidate the author's meaning, which, as applied to this insect, is at present obscure. Notwithstanding this, the identification of the species is in no way doubtful.

Bred by Fitch from *Alucita hexadactyla*, L., July 8th. Wesmael examined four specimens taken near Liége.

2. *Bracon lætus*, Wesm.

Braco lætus, Wesm., Nouv. Mém. Ac. Brux., 1838, p. 13, ♀.

Bright testaceous; a spot on the occiput, pectus, metathorax, and 1st abdominal segment, black or blackish; abdomen wholly rugulose; suturiform articulation well marked, crenate, bisinuated, emarginate in the middle; wings hyaline, stigma fuscous; terebra ♀ as long as the abdomen. ♀. Length, 1½; wings, 3¾ lin.

Antennæ 27-jointed (according to Wesmael, 26-), black. The British specimen has a brown spot on each side of the mesothorax at the base of the wings, from which a fascia extends round the scutellum, covering the upper part of the metathorax, which is gibbous and smooth. First abdominal segment infuscated on the scutum. Ocelli bright red.

Colour more fulvous than in the preceding; the rugulosity of the abdomen finer and more uniform, not coarser at the base of the segments. The females are sufficiently distinguishable by the length of the terebra; in the present species the vertex is more transverse, the legs and wings shorter in proportion.

The ♀ here described was formerly in Walker's collection. Wesmael had only one ♀ from Liége.

3. *Bracon erythrostictus*, n. s.

Testaceus; antennis, stemmatico, occipite, mesothoracis lobis, metathorace, abdominis vitta interrupta, tarsisque apice, nigris; abdomine supra subtiliter transversim rimuloso (in ♂ fere punctulato); articulatione suturiformi crenulata bisinuata; alis subhyalinis, stigmate luteo. Terebra ♀ abdominis dimidio æqualis, vel paulo longior.

Testaceous; antennæ, stemmaticum, occiput, lobes of the mesothorax, metathorax, an interrupted longitudinal stripe on the abdomen, and tarsi at the tips, black; abdomen above minutely and transversely rimulose (in the ♂ almost punctulate); suturiform articulation crenulate, bisinuated; wings subhyaline, stigma luteous; terebra half as long as the abdomen, or a little longer. ♂ ♀. Length, 1½; wings, 3½ lin.

♀. Antennæ black, 34—38-jointed; radicle testaceous. Palpi pale. Disk of mesothorax, and scutellum, black. Metathorax rugulose, not canaliculated. Scutum of the 1st abdominal segment black, rugose, with a basal depression; tubercles placed much before the middle. Second segment with a triangular black rugose spot, like the scutum of the 1st, of which it seems to be a continuation; segments 3—6 have each a larger, transverse, black patch, leaving only the lateral margins, and the sutures narrowly, testaceous. Terebra as long as the hind tibia, or half the abdomen. Wings subhyaline, stigma luteous.

♂ similar; antennæ 40-jointed, much longer than the body; the 1st joint testaceous. Disk of mesothorax with the interstices between the lobes testaceous; scutellum black only at the base. Metathorax smooth, with two longitudinal carinæ uniting at the apex. Spots upon segment 3—6 smaller than those of the ♀, paler, and not contiguous.

Var. ♂. Less than 1 line long. Antennæ broken. Genæ and face, abdominal segments 1—2, at the sides, the latter very broadly, and the legs, testaceous; the rest of the abdomen pitchy. Bred by Fitch July 8th.

Resembles *B. tenuicornis*, Wesm., Nouv. Mém. Ac. Brux., 1838, p. 42, yet the differences of sculpture and colour are too great to allow it to be referred to that species. Neither can it be *B. scutellaris*, Wesm., *lib. cit.*, p. 14, for the antennæ are much too long, and the terebra too short. A specimen which I took in Corsica differs in being a trifle smaller, with shorter (30-jointed) antennæ, and the terebra as long as the abdomen.

I took both sexes together in a marsh near the sea, Milford Haven. Several specimens have since been bred by Fitch at Maldon, in June and July, from galls on the couch-grass, *Triticum repens*, but it is not yet known upon what insect they are parasitic. Bred from similar galls by Moncreaff and thought by Walker to be Wesmael's *tenuicornis* (Entom. v. 240, 451).

4. *Bracon minutator*, Fab.

Bracon minutator, Fab., Piez., 110; Nees, Mon., i., 70, ♂ ♀.
Braco minutator, Wesm., Nouv. Mém. Ac. Brux., 1838, p. 15, ♀.

Black; orbits more or less, lateral margins of abdomen, belly, and tibiæ at the base, testaceous; wings fuscous, paler towards the tips, with a hyaline streak behind the black stigma. Abdomen rugulose on segments 1—2, afterwards punctulate; suturiform articulation notched in the middle, deep, crenulate. Terebra as long as the body. Length, ♂ $1\frac{1}{2}$; wings, $3\frac{1}{4}$: ♀ 2; wings, $4\frac{3}{4}$ lin.

♀. Head black; labrum, mandibles, and orbits, more or less rufescent. Metathorax smooth and shining. Abdomen above black, lateral margins and 3 apical segments almost entirely testaceous; punctulate, subcarinated; segments 1—2 rugulose; 1 subquadrate, margined; 2 longer than 3. Belly testaceous. Antennæ 29—34-jointed. The ♂ is smaller, with the abdomen more oblong; antennæ (in two specimens) 29-jointed; otherwise like the ♀.

Described from 5 males, 3 females. A large species, and easy to recognise. First indicated as British by Curtis, with his usual accuracy ('Guide,' 2d ed., column 115) where it is marked as contained in his collection. Wesmael possessed 2 females. A ♀ was taken by E. A. Butler, at Battle, Sussex; a ♂ by me, Sept. 1st, at Nunton, Wilts; others by Fitch, at Maldon. Elisha bred 2 females, in July, from *Argyrolepia zephyrana*, Tr. Brischke reared it from *Bembecia hylæiformis*, Lasp. (not a British sp.). According to him (Schrift. nat. Ges. Danz., n. s., v. (3) 135) the cocoons are light brown, cylindrical, filling up the bore made by the larvæ.

5. *Bracon fulvipes*, Nees.

Bracon fulvipes, Nees, Mon., i., 74, ♂ ♀.
Braco fulvipes, Wesm., Nouv. Mém. Ac. Brux., 1838, p. 26, pl., fig. 3 (wing).

Black; mandibles, face, orbits more or less, legs, and abdomen, rufo-testaceous; a variable black longitudinal dorsal stripe more or less covering the segments; metathorax rugulose, longitudinally carinated in the middle; abdomen transversely and finely aciculated; wings nearly hyaline, stigma fuscous; terebra ♀ $\frac{2}{5}$—$\frac{3}{4}$ of the abdomen in length. Length, ♂ 1½; wings, 3: ♀ 1½—2¼; wings, 3—4½ lin.

Var. 1, ♀. Metathorax almost smooth; middle and hind coxæ black or testaceous. Rare.

Var. 2, ♀. Head rufo-testaceous, stemmaticum black.

Var. 3, ♀. Orbits of the eyes entirely black.

Var. 4, ♂. Head black, only the mouth and apex of the genæ rufo-testaceous.

Var. 5, ♀. Second segment of the abdomen with two additional black spots, covering the thyridia.

Antennæ ♀ 29—37-jointed, as long as the body, sometimes ferruginous beneath towards the apex. Colours variable: sometimes the prothorax is testaceous; the mesothorax may be bordered with the same colour, its disk longitudinally marked with two lines, or its sides may be testaceous. On each side of the base of the rugulose metathorax is a small smooth space: the longitudinal carina is sometimes indistinct. Abdomen elongate-oval, not very shining; segments 1—2 covered with rugulosities crossing each other irregularly; the following segments transversely aciculated. Segment 1 black, 2 rufo-testaceous with a medial black spot, quadrate, or rounded behind. The 3 next segments have usually larger rectangular black patches, forming a continuous band as far as the 5th inclusive: these vary considerably, and are liable to be diminished to mere disconnected streaks. Legs rufo-testaceous, the last joint of the tarsi blackish; hind coxæ sometimes black at the base. Wings hyaline, or very slightly tinted; stigma and nerves blackish; but the stigma is sometimes pale in the ♀ (according to Wesmael, and in one British specimen).

The ♂ is similar, but smaller; antennæ 34—40-jointed, longer than the body. The black abdominal stripe is usually dilated posteriorly, covering the entire apical half of the abdomen, except a narrow margin all round. Not to be confounded with the ♂ of *mediator*, Nees, sp. 16, which has the abdomen smooth after the 3d segment, segments 2—3 entirely testaceous, &c.

The ♀ is most likely to be confused with *longicollis*, Wesm., sp. 6.

The length of the terebra given by Nees is two-fifths of the abdomen, which corresponds with most of the British specimens, although in some it is rather longer. Wesmael, in his diagnosis, states it to be as long as the abdomen, but subsequently admits that it is sometimes shorter. It is variable, within certain limits, but does not in this country attain the length exhibited by the Belgian specimens.

Generally distributed. Devonshire, Kent, Essex, Norfolk, London district; Yorkshire; Glen Lyon, Clober, Scotland.

6. *Bracon longicollis*, Wesm.

Braco longicollis, Wesm., Nouv. Mém. Ac. Brux., 1838, p. 28, ♀.

Elongate, black; mandibles, sides of the abdomen wholly, or the basal half, belly, and legs, testaceous: middle and hind coxæ, and claws, black: middle and hind femora more or less infuscated at the base; metathorax subelongate, with a medial longitudinal carina (often obsolete); 2d and following abdominal segments very finely aciculated, somewhat shining; wings subhyaline; terebra $\frac{1}{4}$ as long as the abdomen, the valves stout, subclavate. ♂ ♀. Length, $1\frac{1}{2}$; wings, $3\frac{1}{3}$ lin.

Var. ♀. Carina of the metathorax obsolete: posterior femora with a fuscous line above and below, their tibiæ fuscous in the middle. Length, $1\frac{1}{4}$; wings, $2\frac{4}{5}$ lin. Two specimens taken by Bignell.

Antennæ ♀ 29—33-jointed, as long as the body; palpi black; mandibles testaceous. Parallel to the metathoracic carina are a few rugulosities. Abdomen elongate-oval, black; the lateral margins of segments 1—3—4, sometimes of all, together with the belly, testaceous. Segment 2 always finely rugulose, and generally the rest, but the sculpture of these is frequently so minute that they appear shining. Wings not quite hyaline, with an obsolete whitish mark under the fuscous stigma.

The undescribed ♂ has 32-jointed antennæ, longer than the body. Metathorax indistinctly carinated, but with some longitudinal wrinkles. Sculpture and colours of the abdomen as in the more strongly marked females; segment 2 aciculated. Fore femora and tibiæ slightly infuscated; middle and hind femora black, their tibiæ tipped with black, and the tarsi fuscous.

Easily distinguished from the preceding species. It is smaller; the head and thorax are uniformly black, the femora marked with the same colour; the terebra is shorter; and it shows no disposition to run into varieties.

Wesmael's estimate of the length of the terebra $\frac{1}{3}$—$\frac{1}{2}$ of the abdomen, is again somewhat too great for the British specimens.

Generally distributed; Leicester, St. Albans, London district, Devonshire, Sussex, Essex, Norfolk, &c.

7. *Bracon variegator*, Nees.

Bracon variegator, Nees, Mon., i., 89; Wesm., Nouv. Mém. Ac. Brux., 1838, p. 33, ♂ ♀; Cur. Morton's Cyclop. Agric., s. v. *Bracon*; Farm Ins., 370.

Black, varied with yellow; abdomen broadly ovate, subdepressed, granulated throughout; segment 2 subcarinated, with a shallow fovea on each side; wings fuscous, subhyaline at the apex; terebra $\frac{1}{4}$ or $\frac{1}{3}$ of the abdomen. ♀. Length, $1\frac{1}{3}$—$1\frac{1}{2}$; wings, 3 lin.

Antennæ ♀ 18—20-jointed, shorter than the body; palpi blackish; mandibles yellow. Face yellow with a large triangular black spot; orbits and vertex yellow, stemmaticum and occiput black. Thorax black, except a spot on each humeral angle, another beneath the wings, and a large *square* patch on the mesothorax extending over the scutellum; the latter, however, is more or less black at the base. First abdominal segment with yellow lateral margins; belly yellow with two longitudinal rows of black spots. The following segments have sometimes the lateral borders testaceous, and in one specimen segment 2 is almost wholly of that colour, the prominent parts of the surface being blackish. Suturiform articulation bisinuated, crenulate, and notched in the middle; strongly marked, as are the two following sutures, especially at the sides. Segments 3—5 rather punctulate than rugulose, somewhat shining. A smooth medial line is visible in certain lights upon segments 2—5. Legs varied with fuscous and testaceous; coxæ black. Wings with an obsolete whitish fascia; stigma large, ovate, fuscous; 2d cubital areolet as long as the 3d, measured on the cubitus.

♂, according to Wesmael, similar; antennæ 23—24-jointed in the two British specimens; fore legs black, testaceous at the base.

The antennæ, and the length of the 2d cubital areolet, distinguish this species from *B. brevicornis*, Wesm., which it superficially resembles. The *square* yellow patch on the mesothorax is characteristic, and the description given by Curtis, *l. c.*, unmistakable.

Described from six females, one in Walker's collection, the others found in old jackdaw-nests, in company with *B. stabilis*, Wesm., sp. 9. Also taken by Fitch not uncommonly at Maldon. According to Curtis it is a parasite of *Endrosis fenestrella*, Scop.; the ♂ ♀ were likewise captured by him late in August on Hampstead Heath. Two males in bad condition, but apparently of this species, were bred by Elisha from *Lithocolletis torminella*, Freyer. Kawall obtained it in April—May from cones of *Pinus abies* tenanted by *Anobium abietis*, Fab., and *Coccyx strobilella*, L. He considered it a parasite of the former; but it came more probably from the *Tortrix* (Stett. Zeit., 1855, p. 231).

8. *Bracon nigratus*, Wesm.

Braco nigratus, Wesm., Nouv. Mém. Ac. Brux., 1838, p. 34, ♂ ♀.

Black; palpi blackish; fore femora towards the apex, their tibiæ at the base, or entirely, and posterior tibiæ at the base, testaceous; segment 1 obscurely yellowish at the sides, 2—3 each with an obsolete reddish patch at the basal angles, or more or less obscurely rufous, or wholly black. Wings fumato-hyaline, stigma and nervures fuscous; 2d cubital areolet narrow, a little shorter than the 3d. Metathorax smooth. Abdomen with segments 1—3 rugulose, dull; the rest more shining; suturiform articulation straight. Terebra $\frac{1}{4}$ of the abdomen. ♂ ♀. Length, ♂, 1—$1\frac{1}{3}$; ♀ $1\frac{1}{3}$; wings, $2\frac{1}{2}$—$3\frac{1}{3}$ lin.

Antennæ ♀ 31—32-jointed. Belly at the base yellowish, varied with black. Abdomen suborbicular, not longer than the thorax, covered with fine rugosity, becoming finer posteriorly, so that the 4th and following segments are more shining and nearly smooth. Posterior femora (in one specimen) testaceous beneath. Rufous spots on segments 2—3 more distinct than in the ♂. Antennæ ♂ 29—31-jointed (in three examples) longer than the body. Smaller than the ♀; abdomen narrower, the rufous spot diffused, indistinct.

Four specimens; a female taken by Bignell in Devonshire; two males by me near Abergavenny, and a third at Niton, Isle of Wight.

9. *Bracon stabilis*, Wesm.

Bracon punctulator, var. b., Nees, Mon., i., 88, ♂ ♀.
Braco stabilis, Wesm., Nouv. Mém. Ac. Brux., 1838, p. 25, ♂ ♀.
Bracon stabilis, Ratz., Ichn. d. Forst., iii., 38, ♂ ♀.

Black, head varied with testaceous; lateral margins of 1st abdominal segment, and belly, yellow; anterior tibiæ and tarsi more or less, anterior femora sometimes at the apex, and hind tibiæ at the base, testaceous; wings blackish, paler towards the tips, stigma dark brown, unicolorous; 2d cubital as in the following species; terebra ♀ $\frac{1}{2}$ the length of the abdomen, which is ovate, depressed, and rugulose throughout. Length, ♂ 1—$1\frac{1}{2}$; wings, $2\frac{1}{3}$—$3\frac{1}{2}$: ♀ $1\frac{1}{2}$; wings, $3\frac{1}{2}$ lin.

Antennæ ♀ black, together with the palpi, 25-jointed, and ¾ as long as the body. Mandibles, orbits narrowly, two spots beneath the antennæ (sometimes obsolete), margins and under side of the abdomen, yellowish. Legs black, 2d joint of trochanters, apex of femora, and base of tibiæ, testaceous. The tibiæ sometimes testaceous with a black line in front, and middle and hind femora entirely black. Abdomen rugulose above, becoming rather punctulate towards the apex; segments 2—3 more coarsely rugose at the base, and the 2d sometimes with a faint longitudinal carina.

The ♂ is similar, but with more yellow on the face; antennæ 27-jointed, as long as the body. Abdomen rather punctulate than rugulose; segments 2—3 not more coarsely sculptured than the rest; the two apical segments almost smooth.

Common on umbelliferous flowers, and may also be beaten from furze, thatch, &c., in spring; Fitch finds it on windows. Taken in Cadder Wilderness near Glasgow; Leicestershire; Worcestershire; Hainault Forest; Devonshire; Essex. Abundant in old jackdaw nests in a church-tower in Northants, together with *Bracon variegator*, Nees. In the same nests *Attagenus pellio*, L., and some *Tineæ* were also common, of which the Bracons were perhaps parasites. Ratzeburg records that Nördlinger bred this species from ash-bark, with *Hylesinus crenatus*, Fab. W. H. B. Fletcher bred two males and two females, June 6th, from *Gelechia mulinella*, Zell.

10. *Bracon brevicornis*, Wesm. (Pl. I., figs. 1 *a*, 1 *b*).

Bracon punctulator, var. β bis, Nees, Mon., i., 88, ♂ ♀.
Braco brevicornis, Wesm., Nouv. Mém. Ac. Brux., 1838, p. 23, pl., fig. 2 (wing).
In Catalogue of Ichneum., p. 96, dele syn. *Bracon variegator*, Cur.

Black; head, thorax, and scutellum varied with testaceous; femora at the apex, tibiæ and tarsi more or less, 1st abdominal segment at the base and sides (often the 2d also in the ♂), and belly, testaceous; wings brownish, hyaline at the apex, stigma sometimes bicolorous; 2d cubital areolet very small, separated from the exterior margin by twice its own length, measured on the cubitus, which becomes obsolete a little beyond the 2d cubital areolet; terebra ♀ ⅓ the length of the abdomen, which is obovate, depressed, shining, and very finely punctulate. Length, 1¼—1½; wings, 3 lin.

Antennæ ♀ unlike those of any other species, not longer than the head and thorax, stout, 14-jointed in two British specimens

(17-jointed according to Wesmael). Palpi, mandibles, and head testaceous; occiput, stemmaticum, and a facial spot, black; above this spot is a small black longitudinal carina. Thorax black, with the disk testaceous, and black stripes on the mesothoracic lobes; scutellum testaceous, more or less black at the base and apex. Abdomen ♀ ovate, depressed; 1st segment testaceous, with a black, smooth, triangular scutum; the 2d and following segments black (according to Wesmael often narrowly margined at the sides with testaceous), somewhat shining, almost invisibly punctulate. Legs black, apex of femora, fore and middle tibiæ and tarsi more or less, and hind tibiæ at the base, testaceous; sometimes the fore coxæ are testaceous, and all the femora black only at the base. Stigma fuscous, with a testaceous spot at the base, which is sometimes obsolete.

Antennæ ♂ 20—26-jointed according to Wesmael, 21-, 21-, 23-jointed in three British specimens, almost as long as the body; black spot on the face sometimes reduced to a mere transverse line, or the head is black with the orbits and genæ testaceous; scutellum sometimes black, with the lateral margins testaceous, or entirely black. Abdomen more oblong than that of the ♀; segment 1 often pale, with a central black spot; 2d often pale, with some obscure markings. One ♂ has the right antenna 22- and the left 23-jointed.

This species, notwithstanding variations of colour, is easily recognised by the structure of the 2d cubital areolet in both sexes, and by the antennæ of the ♀, which are much shorter and stouter than those of *stabilis* ♀. Both sexes may be also distinguished from *stabilis* by their abdomen, which is shining and almost smooth; that of *stabilis* is dull and ruguloso-punctulate, except towards the apex.

I once reared the ♀ from galls of *Andricus terminalis*, Fab., found near London; and on October 26th, 1884, W. F. Kirby bred six males, one female, from *Ephestia elutella*, Hüb. Brischke obtained a ♂ from *Dioryctria abietella*, Zinck. A ♂ was bred by S. Webb at Dover, Aug. 10th, from *Myelois ceratoniæ*, Zell.

11. *Bracon erraticus*, Wesm.

Braco erraticus, Wesm., Nouv. Mém. Ac. Brux., 1838, p. 35, ♂ ♀.

Black, with black palpi; mandibles, usually some spots on the head, sides of the abdomen at the base, belly at the base, fore femora at the apex, fore tibiæ wholly, middle and hind tibiæ at the base, testaceous; abdominal segments 2—3 finely rugulose, the following segments almost entirely smooth; wings obscure; terebra ♀ as long as the abdomen. Length, ♂ 1¼; wings, 3; ♀ 1½ lin.

Var. 1, ♀. Orbits broadly, disk of mesothorax in front, and margins of abdomen all round, testaceous. Antennæ 30-jointed. Segments 4—5 very finely rugulose.

Var. 2, ♂. Head entirely black, except the mandibles.

♀. Antennæ 29—32-jointed. An orbital spot under the eyes, another on the vertex, and an intermediate spot on each side, testaceous. First abdominal segment with the lateral margins narrowly testaceous; segments 2—3 more broadly, the border becoming attenuated hindwards, and often continued along the 4th segment. Anterior half or two-thirds of the belly also pale. Segments 2—3 finely rugulose longitudinally, 3 sometimes nearly smooth, the rest showing hardly any traces of sculpture. Wings with a hyaline streak under the stigma.

♂ similar; antennæ 37-jointed, in one specimen; orbits often almost entirely testaceous. Segments 2—3 more rugose and less shining; segment 4 with some distinct rugosities.

Bignell has taken in Devonshire four females and two males; one of the latter being var. 2. Elisha bred two males from *Eupœcilia ciliana*, Hüb., July 31st. Brischke obtained a ♂ variety from *Bembecia hylæiformis*, Lasp.

12. *Bracon exarator*, n. s.

Bracon punctulator, var. β, Nees, Mon., i., 88 (e collectione Desmarestiana). ♂ ♀.

Niger, capitis picturis, abdominis segmento 1mo lateribus, ventre, femoribus anticis apice, tibiis anticis fere totis, intermediis basi anguste, posticis latius, testaceis; abdomine ovato, subdepresso, segmentis 1mo et 2do totis, 3tio basi, rugulosis; cæteris lævibus nitidis; terebra abdominis fere longitudine; alis infuscatis, lineola hyalina, stigmate nigro.

Black; orbits partially, 1st abdominal segment at the sides, belly, fore femora at the apex, fore tibiæ almost entirely, intermediate narrowly at the base, hind pair more broadly, testaceous; abdomen ovate, subdepressed, segments 1—2 wholly, 3 at the base, rugulose; the rest smooth and shining; terebra about as long as the abdomen; wings infuscated, with a hyaline streak, stigma black. ♀. Length, 1¾; wings, 3¾ lin.

Nearly allied to *stabilis*, Wesm., but differs in having the 2d cubital areolet of normal length, in the sculpture of the abdomen, and the greater length of the terebra. Antennæ ♀ 31-jointed, as long as the body, and, like the palpi, black; mandibles testaceous. Orbits rufo-testaceous on the vertex, which colour is interrupted beneath, leaving only two or three obscure spots. Metathorax transversely rugulose in the middle, and obsoletely canaliculated. Abdominal segments 1—2 rugulose, the 3d more finely at the sides and base, with a smooth medial line; the rest smooth: segment 2 obsoletely carinated.

This does not seem to be the typical *B. punctulator*, Nees, in which the segments after the 3d are not smooth, the terebra is only as long as the 5th and following segments, &c. In any case the name *punctulator*, under which are comprised several distinct species, must be rejected.

A single ♀ captured by Bridgman at Brundall, Norfolk, Sept. 15th.

13. *Bracon triangularis*, Nees.

Bracon variator, var. *a*, Nees, Mag. Ges. Berl., 1811, p. 8, ♀.
B. triangularis, Nees, Mon., i., 81, ♀.

Black; palpi concolorous; mandibles testaceous; orbits sometimes dull rufous; abdomen fulvous, segment 1, or a spot upon it, and sometimes a spot on segments 2—4, black or piceous; legs black, narrowly rufous at the articulations, and the apex of the lower trochanters. Wings more or less dark fuscous, with a hyaline streak. Metathorax smooth. Segment 2 rugulose in the middle of the base; suturiform articulation bisinuated. Terebra as long as the abdomen. ♀. Length, $1\frac{3}{4}$—$2\frac{1}{4}$; wings, $3\frac{1}{2}$—$4\frac{1}{2}$ lin.

Antennæ 30-jointed (in one specimen) somewhat shorter than the body. Metathorax with vestiges of a carina, and a basal impression. Abdomen elongate-oval, rather longer than the head and thorax; segment 1 with a piceous spot in the middle, 2 with an oval, piceous, rugulose, basal spot (forming an imperfect scutum like that of the 1st) and on each side, a small linear impression; 3—4 each with a larger, transverse, subrectangular piceous spot. No doubt these marks are variable; the specimen described by Nees had segment 1 black, margined, and longitudinally depressed, fulvous at the apex; 2 with a black triangular basal spot, which was punctulato-rugose at the base. Terebra straight, the valves black, hardly ever longer than the abdomen. The wings are described as black; those of the British specimen are subfuscous.

Bracon megapterus, Wesm., Nouv. Mém. Ac. Brux., 1838, p. 22, ♀ is so described as to include the present species, except that the terebra is only two-fifths of the abdomen.

B. triangularis, Nees, was first recorded as British by Curtis (Guide, 2d ed., 1837, column 115) and as contained in his collection. The specimen above described was sent by Fitch. Brischke bred it from *Bembecia hylæiformis*, Lasp., a Sesiid not known as British.

14. *Bracon Roberti*, Wesm.

Braco Roberti, Wesm., Nouv. Mém. Ac. Brux., 1838, p. 37, ♀.

Black; abdomen testaceous, with the 1st segment, a round rugulose spot at the base of the 2d, and a row of contiguous patches on segments 3—7, forming a broad band, black; suturiform articulation straight; wings blackish, with an angulated whitish mark underneath the stigma: terebra ♀ as long as the abdomen. Length, ♂ 1½; wings, 3¾: ♀ 2; wings, 4⅔ lin.

Antennæ ♀ 36-jointed, as long as the body; palpi black. Metathorax smooth, not carinated. First abdominal segment with the lateral margins testaceous; segment 2 testaceous, with a black rugulose subtriangular basal spot, not reaching the hind margin; 3—7 with larger, transverse patches, covering the disk except the lateral margins, which, with the belly, are testaceous. Abdomen, after the 2d segment, entirely smooth.

The ♂ has the antennæ about 38-jointed, as long as the body, and differs from the ♀ only in size, and in having the knees obscurely pitchy.

This species has the facies of *B. variator*, Nees, but differs in being much larger, with rugulosities at the base of the 2d segment.

Rare. I took the ♂ in North Devon, Braunton Burrows; and the ♀ in a similar sandy situation, Freshwater Bay, Pembrokeshire. Wesmael only knew a single ♀ taken by Robert near Liége.

15. *Bracon lævigatus*, Ratz. (Pl. I., fig. 1).

Bracon scutellaris, Ratz., Ichn. d. Forst., ii., 41, ♂ ♀ (not of Wesm.)

B. lævigatus, Ratz., *lib. cit.*, iii., 39.

Testaceous, variable; head, thorax and abdomen more or less diversified with black or pitchy; antennæ black, or fuscous, pale at the extreme base ; legs testaceous, claws black ; tarsi, and sometimes hind tibiæ at the apex, fuscescent. Wings hyaline, stigma fuscous; apical nervures decolorous. Body entirely smooth and shining, except the 2d abdominal segment, which is more or less aciculated ; suturiform articulation sinuated. Terebra longer than the abdomen ; valves black. ♂ ♀. Length, ♂ 1¼; wings, 3 : ♀ 1—1¾ ; wings, 3—5¼ lin.

The following are the principal varieties of the ♀ :—

Var. 1. Stemmaticum, occiput, metathorax, 1st abdominal segment, an aciculated spot on the 2d, and two smaller spots on each of the 3d and 4th, black. Length, 1¾ lin.

Var. 2. Vertex and occiput, 3 bands on the mesothoracic lobes, metathorax, segment 1, and a dorsal band reaching nearly to the anus, black. Length, 1¼ lin.

Var. 3. Head black or pitchy ; orbits rufescent ; mesothoracic lobes, metathorax, and segment 1, black ; the remaining segments pitchy above ; segment 1 at the sides, suturiform articulation, and anus, testaceous. Length, 1¼ lin.

Var. 4. Like the last, but all the dark parts pitchy ; abdomen pitchy-testaceous. Length, 1 lin.

The colours of the ♂ are more uniform. Head testaceous or pitchy ; stemmaticum, or vertex, or both, and occiput, 3 stripes on the mesothoracic lobes (of which the middle one is abbreviated hindwards), metathorax, and abdomen above, black ; segment 2 testaceous with a black discal spot, or entirely pitchy ; hinder margins of the 3d and following segments narrowly pale.

Antennæ of both sexes slender, and longer than the body ; those of the ♂ 26—29, of the ♀ 20—32-jointed ; the large females of var. 1 have the greatest number of joints. Abdomen as long as the head and thorax ; segment 1 longer than its apical breadth, margined, smooth, elevated towards the apex, narrowed towards the base, and there excavated ; segment 2 aciculated, the rest smooth. The differences of size and colour between the largest and smallest ♀ are such that, if their origin were unknown, they would be taken for distinct species.

Described from four males, seven females. Two females are in Parfitt's collection. The remaining nine specimens are part of a greater number bred by Fitch at Maldon from the willow-galls of *Nematus pedunculi*, Hart., during June, July, and August. According to Ratzeburg, Heyer reared them from similar galls on *Salix aquatica*, and Brischke a single specimen from *Salix aurita*.

16. *Bracon mediator*, Nees.

Bracon mediator, Nees, Mon., i., 69, ♀.

Braco mediator, Wesm., Nouv. Mém. Ac. Brux., 1838, p. 39, ♂.

Black; mouth, legs (with coxæ), and abdomen, rufo-testaceous; scutum of 1st segment, and 4 last segments entirely, black; segment 2 rugulose at the base, 3—7 smooth; wings subhyaline, stigma blackish; terebra ♀ as long as the body. Length, ♂ 1⅓—2; wings, 3½—4½: ♀ 2—3; wings, 4½—5¾ lin.

Antennæ ♀ 33-jointed, scarcely shorter than the body; mandibles and palpi testaceous. On each side of the vertex is a subobsolete rufous spot, often wanting. Metathorax shining, with an inchoate apical carina, from which branch out on either side a few rugosities. Second abdominal segment rugulose, except the hind margin; sometimes there is a small black spot in the middle of the base; suturiform articulation slightly sinuated; segments 3—5 rufo-testaceous, the rest black.

The ♂ is similar; antennæ 36—40-jointed, as long as the body; segments 2—3 rugulose; 4th black with the base rufo-testaceous, or rufo-testaceous with the sides and apex black; even the 3d is sometimes black at the apex.

Described from 18 males and 6 females. The latter vary considerably in size; one is very large as compared with the rest, being 3 lines long, or 5 lines including the terebra; this is the largest British *Bracon* I have seen. *B. fuscicoxis*, Wesm., is distinguished from this species by being generally smaller, having black coxæ, a shorter terebra, &c.

I am indebted to Bignell for a knowledge of the habits of this species, which is a parasite of *Trochilium crabroniforme*, Lewin, feeding on the wood of the sallow. Thirty-three specimens, all males, bred from an osier-stem, two years old, in Yorkshire, were sent to Bignell in June, 1884, by Harwood, of Colchester. They emerged from the 7th to the 12th of the month. Four of these specimens were sent to me. Some years ago I used to find both sexes commonly in an osier-bed near Aylestone, Leicestershire, now destroyed. Cameron has taken them frequently in Cadder Wilderness near Glasgow; and Fitch near Maldon. Cocoons brown, of loose texture, filling the cavity occupied by the larva of *Sesia*; each cocoon is about 3½ lines in length.

17. *Bracon Vectensis*, n. s.

Niger, palpis fuscis, abdominis segmento 1mo lateribus, 2do toto, 3tio maximam partem, femoribus anticis, tibiisque omnibus, piceo-flavis, tibiis posterioribus apice fuscis. Alæ fumato-hyalinæ, stigmate nervisque fuscis. Metathorax lævis. Abdominis segmentum 1mum longius quam latius, marginatum, nitidum, basi excavatum, apice aciculatum, sicut 2dum; cætera lævia; articulatio suturiformis recta.

Black; palpi fuscous; segment 1 at the sides, 2 entirely, 3 for the most part, fore femora, and all the tibiæ, pitchy or dull yellowish; posterior tibiæ fuscous at the apex. Wings fumato-hyaline, stigma and nervures fuscous. Metathorax smooth. Segment 1 longer than broad, margined, shining, excavated at the base, aciculated at the apex; 2 also aciculated; the rest smooth; suturiform articulation straight. ♂. Length, 1; wings, $2\frac{1}{4}$ lin.

Antennæ 26-jointed, stout, longer than the body. The pale parts are dull ochreous, without any tinge of red: segment 3 is mostly pale, but the sides and apex are indeterminately blackish; the following segments entirely black.

The single specimen was taken at Niton, Isle of Wight.

18. *Bracon fuscicoxis*, Wesm.

Braco fuscicoxis, Wesm., Nouv. Mém. Ac. Brux., 1838, p. 32, ♂ ♀.

Black, with pale palpi; mandibles, abdomen in the middle, and legs, testaceous; the coxæ black; metathorax carinated; 2d abdominal segment rugulose at the base, within the area of a black spot; wings subfuscous, stigma brown; terebra ♀ $\frac{1}{2}$ as long as the abdomen. Length, ♂ $1\frac{1}{4}$; wings, 3: ♀ $1\frac{1}{2}$; wings, $3\frac{3}{4}$ lin.

Antennæ ♀ 27—29-jointed, as long as the body. Metathorax subrugulose, with a distinct longitudinal medial carina. First abdominal segment black, lateral margins narrowly testaceous; 2d testaceous, with a medial, obtriangular, rugulose, black spot; 3d wholly testaceous, or with an indeterminate blackish spot on the hind margin; segments 2—3 almost microscopically punctulate, the rest smooth: segments 4—5 black, with testaceous lateral margins, 6—7 wholly black, shining. Belly testaceous. Wings with a vestige of the usual whitish fascia.

The ♂ is similar; antennæ 37—38-jointed in three specimens, (according to Wesmael, 30-jointed).

Described from four females and three males. Taken in Leicestershire, and both sexes together at Nunton, Wilts; by Fitch at Maldon; by Bridgman near Norwich; and by Cameron in Scotland (Possil, Rannoch).

19. *Bracon tornator*, n. s.

Niger, ore, palpis, abdominis lateribus plus minus, femoribus anticis apice, tibiis iisdem totis, trochanteribus inferis, rufo-testaceis; coxis nigris; tibiis posterioribus basi flavidis, apice nigris; metathorace lævi, apice carinato; alis fumato-hyalinis vel subhyalinis; terebra abdominis fere longitudine.

Black; mouth, palpi, sides of abdomen more or less anteriorly, fore femora at the apex, their tibiæ entirely, and the lower trochanters, rufo-testaceous; coxæ black; posterior tibiæ yellowish at the base, black at the apex; metathorax smooth, carinated at the apex; wings fumato-hyaline or subhyaline; terebra about as long as the abdomen. ♂ ♀. Length, ♀ $1\frac{2}{3}$; wings almost 4 lin.: ♂ $1\frac{1}{2}$; wings, 3 lin.

Antennæ ♀ 29-jointed (in three examples) a little shorter than the body. Metathorax smooth, with an inchoate carina at the apex. Abdomen ovate, as long as the head and thorax, broadly sessile; segment 1 black, rugulose at the base, its apical tuberosity large, orbiculate and smooth; lateral margins narrowly yellow: segment 2 smooth, except sometimes a few minute longitudinal wrinkles in the middle of the base; the rest of the abdomen smooth. Segment 2 testaceous, with a black longitudinal band; segment 3 with a larger, transverse, black patch, rounded in front; segment 4 black with the lateral margins testaceous; the remaining segments entirely black. Belly testaceous. Suturiform articulation straight. In a second ♀ the testaceous border of segments 2—3 is narrower, and does not reach segment 4; the fore femora have a black streak at the base. A third ♀ in Fitch's collection differs in having the wings fuscescent.

♂. Antennæ 31—33—35-jointed, in three examples; longer than the body. Fore femora black at the base. Sides of the abdomen broadly testaceous, that colour extending almost to the apex, and over the disk, so as to leave a medial black, subinterrupted band. Smaller, but otherwise similar to the ♀.

I found one ♀ in Leicestershire, and another at Nunton, Wilts. Parfitt sent a ♂ for examination, probably from Devonshire; two were taken by me at Rannoch; and two are in Fitch's collection.

20. *Bracon guttiger*, Wesm.

Braco guttiger, Wesm., Nouv. Mém. Ac. Brux., 1838, p. 19, ♂ ♀; Ratz., Ichn. d. Forst., ii., 40.

Black; mandibles and palpi testaceous; circular space between clypeus and mandibles unusually large; legs testaceous, varied with black; 1st abdominal segment pale at the sides, 2d with a yellowish spot on each lateral margin; belly testaceous, with transverse black lines interrupted in the middle; wings subhyaline; terebra ♀ ¼, or sometimes ⅕, as long as the abdomen. Length, 1—1½; wings, 2½—3½ lin.

Antennæ black, 27-jointed in both sexes, those of the ♀ as long as the body, of the ♂ longer. Metathorax shining, with a few rugosities, and traces of a medial carina. Second abdominal segment longitudinally rugose, the apical margin, and all the following segments, smooth: 8th segment of the ♀ (protruded in one specimen) whitish. Suturiform articulation slightly bisinuated, emarginate in the middle. Legs dull testaceous, with black coxæ; middle femora with a black line above, or nearly all black; hind tibiæ, and all the tarsi, fuscous at the apex. In the ♂ the 3d abdominal segment has a minute yellowish spot on each side, like the 2d; otherwise similar to the ♀.

Var. ♂ ♀. Abdominal segments 2—3 with a transverse testaceous band.

According to Ratz., *lib. cit.*, 41, parasitic on *Coleophora laricella*, Hüb., emerging early in June. Taken by Wesmael in May and June. Rather common in England; Earlham, Brundall, Norwich; Nunton, Wilts, &c.

21. *Bracon Satanas*, Wesm.

Braco Satanas, Wesm., Nouv. Mém. Ac. Brux., 1838, p. 30, ♂ ♀.

Elongate, black; fore femora at the apex, fore tibiæ, posterior tibiæ at the base, and tarsi more or less, testaceous. Wings subinfuscated, stigma and nervures blackish. Metathorax generally, but not always, carinated. Abdomen oblong, the sides parallel to near the apex; segment 2 (and base of 3 in the ♂) longitudinally rugulose; the rest shining, with some shallow scattered punctures. Terebra ⅓ the length of the abdomen, or somewhat less; valves stout, subclavate. Length, ♂ 1½; wings, 3½: ♀ 1¾; wings, 4 lin.

Var. 1, ♂ ♀. Smaller; terebra ⅕ abdomen. Length, 1—1¼ lin. Wesm.

Var. 2. ♂. Posterior femora fusco-testaceous. Length, 1½ lin. Wesm.

Var. 3, ♀. Segments 2—3 at the sides, and the tibiæ entirely, testaceous; terebra more slender, ½ abdomen. Length, 1½ lin. Wesm.

Antennæ ♀ 33—36-jointed, as long as the body; palpi blackish, mandibles testaceous in the middle. Metathorax with some wrinkles on each side of the carina. Abdomen shining; segment 1 narrowly testaceous at the sides; 2 longitudinally rugulose, with a faint medial carina, the hind margin smooth; suturiform articulation slightly sinuated in the middle. Wings with an obsolete white mark under the stigma. The ♂ is similar, with 37—39-jointed antennæ, longer than the body; 4 anterior tarsi sometimes testaceous, with the last joint black.

The largest of the British species with a black abdomen, and not common. Wesmael's three varieties have not yet occurred here. He possessed altogether fifteen specimens taken near Brussels. Described from a fine pair taken, the ♂ by Fitch, the ♀ by Bridgman: Cameron has captured several in Scotland, at Glenelg, and Cadder Wilderness, near Glasgow; and I took a ♂ and four females near Abergavenny.

22. *Bracon fraudator*, n. s.

Niger, palpis obscuris; ventris basi pallida; ore, orbitis supra obsolete, segmentorum 1—2 marginibus, pedibusque, rufo-testaceis; coxis et trochanteribus superis nigris; tarsis cum tibiarum posticarum apice fuscis. Alæ hyalinæ, nervis fuscescentibus, stigmate testaceo, fusco marginato. Metathorax aciculatus, basi lævis, medio leviter impressus, carina etiam media inchoata. Abdomen ovatum, depressum, capiti thoracique longitudine æquale, segmentis 1—2 aciculatis, cæteris lævibus; segmento 1mo subquadrato, marginato; articulatione suturiformi medio vix subsinuata. Terebra abdominis dimidio brevior.

Black; palpi dusky; belly pale at the base; mouth, orbits above indistinctly, sides of segments 1—2, and legs, rufo-testaceous; coxæ and upper trochanters black; tarsi, and tips of hind tibiæ, fuscous. Wings hyaline, nervures pale fuscous, stigma testaceous bordered with fuscous. Metathorax aciculated, except at the base, with a medial impression and the commencement of a carina. Abdomen ovate, depressed, as long as the head and thorax; segments 1—2 aciculated, the rest smooth; segment 1 subquadrate, margined; suturiform articulation faintly sinuated. Terebra shorter than ½ abdomen. ♀. Length, 1½; wings, 3 lin.

Antennæ 29-jointed, rather shorter than the body. Resembles *terebella*, Wesm., but as the metathorax and abdomen are not smooth, the terebra longer, &c., it must be for the present recorded as distinct.

A single specimen taken by Cameron at Clober, Scotland.

23. *Bracon epitriptus*, n. s.

Niger, mandibulis piceis, palpis pallidis; metathorace lævi; abdomine nigro vel (in minoribus) piceo, segmenti 1mi lateribus apice, 2di macula utrinque laterali, ventre, pedibusque, pallide testaceis; segmento 2do basi aciculato, articulatione suturiformi recta. Alæ fere hyalinæ, stigmate nervisque fuscis. Terebra abdomine triente brevior.

Var. 1. Duplo minor, pedibus ♂ fusco variis, ♀ pallidioribus, coxis piceis.

Var. 2. Segmento 3tio ♀ rufo-piceo.

Black; mandibles pitchy, palpi pale; metathorax smooth; abdomen black or (in small specimens) pitchy; segment 1 at the sides posteriorly, a spot on each side of the 2d, belly, and legs, pale testaceous; segment 2 aciculated at the base, suturiform articulation straight. Wings subhyaline, stigma and nervures fuscous. Terebra $\frac{1}{3}$ shorter than the abdomen. ♂ ♀. Length, 1—1½; wings, 2⅓—3½ lin.

Var. 1. Only half as large; legs ♂ varied with fuscous; coxæ pitchy.

Var. 2, ♀. Segment 3 rufo-piceous.

Antennæ ♀ 24—28-jointed, slender, as long as the body. Metathorax smooth, often impressed in the middle. Abdominal segments 1—2 aciculated, the apex of the latter, and the rest, smooth; abdomen oblong-ovate, acuminated posteriorly, as long as the head and thorax. Legs pale testaceous, coxæ black, or piceous; femora sometimes above, and hind tibiæ at the apex, infuscated. Stigma large; 2d intercubital transverse vein in the ♀ decolorous. The ♂ is rarely as large as the ♀, generally much smaller, and narrower; antennæ 26—31-jointed, longer than the body: 4 posterior femora, and hind tibiæ, often infuscated, and the abdomen, or the whole body, piceous.

The smaller individuals of both sexes have fewer joints in the antennæ, and are paler in colour; the males have hardly any aciculation on the 2d segment.

Described from 27 specimens, 9 males, 18 females, differing in size and development, but apparently all of one species. The ♂ is not *vitripennis*, Ratz. (iii. 37), which has 23-jointed antennæ, and is said to be so like *discoideus*, Wesm., as to pass for a variety; nor can the ♀ be considered *pellucidus*, Ratz. (*l. c.*), the terebra of which is only $\frac{1}{3}$—$\frac{1}{2}$ of the abdomen, and the antennæ 23—26-jointed. Both of Ratzeburg's species, however, are insufficiently described. The small males are very like those of *discoideus*, Wesm., but the latter may be known by their dusky wings; the females are easily distinguished.

A common species, but hitherto, as it seems, overlooked. Taken in the London district, Northants, Yorkshire, Devonshire, and Wilts. I have always supposed it to have some relation to willows; and this is confirmed by the breeding of a ♂ by Bignell, Sept. 3rd, from a gall of *Hormomyia capreæ*, Winnertz.

24. *Bracon larvicida*, Wesm.

Braco larvicida, Wesm., Nouv. Mém. Ac. Brux., 1838, p. 41, ♀.

Black, with pale palpi; mandibles, lateral margins of abdominal segments 1—2, and sometimes 3, but often the 1st only, obscurely testaceous; belly entirely, or at the base, and legs, testaceous; middle and hind coxæ black; 4 posterior femora, or only the hindmost, more or less infuscated; segment 2 rugulose at the base; wings subhyaline, stigma fuscous; terebra ♀ rather more than $\frac{1}{2}$ the length of the body. ♀. Length, $1\frac{1}{4}$; wings, $2\frac{3}{4}$ lin.

Antennæ ♀ 25-joinied, stout, black or fuscous, about $\frac{3}{4}$ as long as the body. On each side of the vertex is an obscure, orbital, reddish spot, and a similar one below each eye, all sometimes wanting. Second abdominal segment rugulose on its basal half, the rest of the abdomen smooth. In one specimen the 2d segment is almost entirely piceous. The pale margins of segments 2—3 are sometimes obliterated. Suturiform articulation straight. Metathorax smooth, with an imperfect carina, widely interrupted in the middle.

Three females taken in N. and S. Devon.

A small ♀ from Leicestershire, only 1 line long, which I formerly supposed to be a distinct species, is probably only a variety of *larvicida*, with the 4 posterior tibiæ infuscated at the apex.

25. *Bracon prætermissus*, n. s.

Braco immutator, var. 2, Wesm., Nouv. Mém. Ac. Brux., 1838, p. 16, ♂ ♀; antennæ 22—26-jointed (not of Nees).

♀. Niger, nitidus, palpis pedibusque concoloribus, geniculis omnibus, posticis latius, et segmentorum 1—2 lateribus, testaceis. Alæ infumatæ, stigmate nervisque nigricantibus. Metathorax fere lævis. Abdomen ovatum, segmentis 1—2 scabriculis, illo marginato, cæteris lævibus, nitidis; articulatio suturiformis vix medio emarginata. Terebra abdomine vix paulo brevior. ♂ simillimus, sed segmento 3tio, immo etiam 4ti basi, tenuiter aciculatis.

♀. Black, shining; palpi and legs also black, all the knees, the hind ones more broadly, and the sides of segments 1—2, testaceous. Wings infumated, stigma and nervures blackish. Metathorax almost smooth. Abdomen ovate, segments 1—2 aciculated, the former margined, the rest smooth and shining; suturiform articulation scarcely emarginate in the middle. Terebra very little shorter than the abdomen. ♂ very similar, but the 3d segment, or even the base of the 4th, is finely aciculated. ♂ ♀. Length 1¼—1½; wings, 3—3¼ lin.

Var. 1, ♀. Legs testaceous, only the posterior femora above, and the tarsi, black: segment 2 entirely black; antennæ 32-jointed.

Var. 2, ♀. Segments 1—2 almost smooth; antennæ 32-jointed.

Antennæ ♀ 24—32-jointed, as long as the body. Metathorax shining, smooth, with a few minute transverse wrinkles, and at the apex an inchoate carina. Segments 1—2 at the sides, 2 more broadly, and 3 at the basal angles, testaceous, as well as the anterior half of the belly; segments 1—2 exarated in the ♀, the rest smooth; in the ♂, segments 3—4, the latter only at the base, are still more finely sculptured. ♂ similar, as large as the ♀; antennæ 32-jointed, longer than the body.

Bracon immutator, Nees, Mon., i., 76, differs in having the abdomen fulvous, varied above with black, and the terebra as long as the abdomen, or longer. Hence I cannot think that Wesmael's *immutator* is the same species, and still less the varieties. The form which occurs in England is constant, as above described, and has every appearance of being a good species.

Common; described from 1 ♂ taken by Bignell; 4 females by myself in September at Nunton, Wilts; and 1 ♀ (var. 2) May 30th, by Fitch at Maldon.

26. *Bracon colpophorus*, Wesm.

Braco colpophorus, Wesm., Nouv. Mém. Ac. Brux., 1838, p. 46, ♀.

Black; mandibles at the apex, palpi, sides of segment 1, or 1—2—3, femora at the apex, fore tibiæ entirely, posterior at the base, testaceous. Wings dark fuscous, with a hyaline streak. Body entirely smooth and shining. Suturiform articulation almost straight. Terebra about $\frac{1}{3}$ abdomen. ♂ ♀. Length, $1\frac{1}{3}$; wings, $3\frac{1}{2}$ lin.

Entirely black above, except the margins of segments 1—3 (only of segment 1 in British examples), and very shining. Antennæ 28-jointed in one ♀ (25-, according to Wesmael), as long as the body. Belly testaceous, darker posteriorly. Wesmael gives the length of the terebra differently in two places, as $\frac{1}{3}$ and $\frac{2}{3}$ abdomen; the former appears to be more correct. The ♂ is similar; antennæ 30-jointed.

Fitch has taken both sexes at Maldon, and I have a ♀ from St. Albans. The *B. colpophorus* ♀ of Ratzeburg (Ichn. d. Forst., iii., 72) is doubtful, for he describes the wings as only a little infuscated, and further compares it with his *B. pellucidus* (see sp. 27 infra, ad fin.). It was bred by Bach from pods of *Ervum hirsutum*, tenanted by *Apion craccæ*, L., and *Apion difficile*, Hbst.

27. *Bracon discoideus*, Wesm.

Braco discoideus, Wesm., Nouv. Mém. Ac. Brux., 1838, p. 45, ♀; Ratz., Ichn. d. Forst., ii., 38, iii., 36, ♂ ♀.

Black; mandibles, palpi, lateral margins of the abdomen narrowly, belly, and legs, testaceous; hind coxæ, hind tibiæ at the apex, and hind tarsi, black or blackish; metathorax smooth; wings subfuscous, with a whitish spot below the stigma; terebra ♀ nearly as long as the abdomen. Length, ♂ 1; wings, $2\frac{1}{2}$: ♀ 1—$1\frac{1}{4}$; wings, $2\frac{2}{3}$—$3\frac{1}{2}$ lin.

Var. 1 ♀. Hind coxæ testaceous. Rare.

Var. 2 ♀. Second abdominal segment with a few rugosities at the base.

Antennæ ♀ 25-jointed, nearly as long as the body. The narrow testaceous border of the abdomen sometimes disappears after the 3d segment. The entire disk of the abdomen is always black and shining, with a few short pale hairs. Some examples have a few rugosities at the base of the 2d segment, which must be regarded as exceptional. Squamulæ and radices of the wings testaceous; stigma and nervures blackish.

The ♂ here introduced has 28-jointed antennæ, longer than the body; the 1st abdominal segment is narrowly edged with testaceous at the sides, the rest are piceous-black without paler margins, but with a few scattered hairs: the hind coxæ are black, the others being testaceous; the hind femora are infuscated, as in one of the females.

Described from 5 females and 1 male. Common. London district, Yorkshire, Northamptonshire, Devonshire, &c.

Bred plentifully in July by Ratzeburg from the rolled-up leaves of the aspen, formed by *Rhynchites betuleti*, Fab.; by Reissig from poplar leaves rolled up by *R. populi*, L.; by Brischke from the galls of *Nematus viminalis*, L. Giraud states it to be a parasite of *Balaninus pyrrhoceras*, Marsh.

Bracon vitripennis, Ratz., Ichn. d. Forst., iii., 37, is closely allied, and probably exists in England. Like *B. discoideus*, but with hyaline wings; legs testaceous; hind coxæ, and apex of hind tibiæ, with their tarsi, blackish. Abdomen suborbicular, lateral margins and belly testaceous. Antennæ ♂ 23-jointed. Reared from willow-galls (Weidenrosen) of *Salix alba*, *fragilis*, and *aurita*, produced by *Cecidomyia rosaria*, Loew, by Brischke, according to Ratzeburg; but not mentioned by Brischke himself; *cf.* Schrift. nat. Ges. Danzig, n. s. v. 3, 135, 178.

Bracon pellucidus, Ratz., *lib. cit.*, iii., 37, ♀, is another kindred species, likely to be found in this country, and perhaps the ♀ of *vitripennis*, Ratz. Length, 1 line; terebra $\frac{1}{3}$—$\frac{1}{2}$ abdomen; wings hyaline; antennæ 23—26-jointed; abdomen on each side of the base with a pale pellucid spot. Legs pale, hind tibiæ infuscated; or fore tibiæ at the base, and the 4 posterior almost entirely black. Parasitic in *Psyche*-cases on alder-leaves, &c. *B. osculator*, sp. 34, infra, seems hardly to differ from *pellucidus*, except in the colour of the wings.

28. *Bracon regularis*, Wesm.

Braco regularis, Wesm., Nouv. Mém. Ac. Brux., 1838, p. 44, ♂.

Black; mandibles pale; palpi dusky testaceous; abdomen ♀ rufo-testaceous, segment 1 and a patch on 3, 4, 5, black; of the ♂ only the base and apex black; legs rufo-testaceous, posterior coxæ, hind tibiæ at the apex, and tarsi, black. Metathorax and abdomen smooth and shining; suturiform articulation straight. Wings fuscous, paler beyond the stigma, before which is a whitish streak;

squamulæ pitchy or testaceous. Terebra as long as $\frac{1}{5}$ of the abdomen. ♂ ♀. Length, 1$\frac{2}{3}$; wings, 3$\frac{3}{4}$ lin.

♀. Antennæ 32-jointed, as long as the body, which is entirely smooth and shining. Metathorax with an inchoate carina at the apex. Segment 1 subquadrate, margined, elevated in the middle, black, bordered laterally with yellow; the other segments rufo-testaceous, 3—5 each with a black discal spot, forming a continuous band; in another specimen these spots are much diminished, and fuscous, segment 2 having likewise a round fuscous spot. Hind tibiæ sometimes not darker at the tips.

♂. Antennæ 35—37-jointed, longer than the body. Abdomen rufo-testaceous, with the 1st segment, the 6th in the middle or almost entirely, and the 7th, black; segments 3—5 immaculate. Sometimes the hind coxæ are testaceous with the base black, and the 4 anterior tarsi testaceous. Otherwise like the ♀.

Described from 2 males, 2 females; the latter were not known to Wesmael, but their correspondence with the other sex is too complete to be doubted.

Wesmael possessed 4 males taken in June near Brussels. I found a ♂ at Niton, Isle of Wight, and another in Northamptonshire. The females were taken by Fitch at Maldon.

29. *Bracon caudatus*, Ratz.

Bracon caudatus, Ratz., Ichn. d. Forst., ii., 40, ♀; iii., 38, ♂.

Black; mandibles partly pale, palpi fuscous with pale articulations; metathorax short, abruptly sloping, and, like the abdomen, smooth; suturiform articulation straight; abdomen testaceous, with a large black discal patch, leaving a pale margin all round: legs pale, coxæ, tips of the hind tibiæ, and all the tarsi, fuscous: wings ample, subhyaline, stigma brown; terebra ♀ longer than the body, or about 4 times the length of the hind tibiæ. Length, ♂ 1; ♀ 1$\frac{1}{3}$; wings, 3$\frac{2}{3}$; terebra, 1$\frac{2}{3}$ lin. long.

Resembles *B. caudiger*, Nees, Mon., i., 77, but has a longer terebra, and is sufficiently distinct. Antennæ ♀ 29-jointed, longer than the body. Abdomen short-ovate, not quite so long as the head and thorax; the black patch on the disk, according to Ratzeburg, is variable, sometimes terminating with the 3d or 4th segment; the legs also are more or less black or testaceous.

Antennæ ♂ 32-jointed. The black on the abdomen is more extended than in the ♀, covering the last three segments. Legs fusco-testaceous, hind coxæ and hind tarsi blackish.

A ♀ was taken near Norwich by Bridgman, May 24th. The species is now first noticed as British. Reared abundantly by Reissig, Tischbein, and Brischke from galls of *Andricus terminalis*, Fab., that had been kept during the winter, making its appearance, with many other parasites, at the end of May. Walker records a specimen of a *Bracon* which he bred in March, and 6 more in May, from the same galls collected near Southgate (Zool. iv. 1456).

The following species (or variety?) should also be found in England. *B. longicaudis*, Ratz., Ichn. d. Forst., iii., 38. Abdomen wholly pale, except the 1st segment; terebra longer than that of *B. caudatus*. ♀. Length, 1¼; with the terebra, 2¾ lin. Bred by Nördlinger at the end of May from galls upon young oak-shoots (the species not mentioned). *B. caudiger*, Nees (Mon., i., 77, 103, ♀) is stated by that author to have been found July 4th, by Gravenhorst "in Silesiæ quercu," and with *caudatus*, Ratz., forms a section of the present genus with a speciality for oak-galls, and furnished, like *Callimome*, with an unusually long ovipositor, to enable them to reach the inhabitants of those excrescences.

30. *Bracon terebella*, Wesm.

Braco terebella, Wesm., Nouv. Mém. Ac. Brux., 1838, p. 57, ♀.

Black; mandibles, lateral margins of the abdomen narrowly, belly, femora at the apex, and tibiæ at the base, testaceous; metathorax and 1st abdominal segment smooth; wings subfuscous; suturiform articulation subsinuated in the middle; terebra ♀ ¼ abdomen. ♀. Length, 1½; wings, 3¾ lin.

Var. 1, ♀. Smaller, antennæ 28-jointed, hind femora with the apical half testaceous, terebra ⅛ of the abdomen. Length, 1 line.

Var. 2, ♀. Abdomen and legs entirely rufo-testaceous. An old specimen from Walker's collection. Length, 2; wings, 4 lin.

Antennæ ♀ 28—32-jointed, as long as the body. Metathorax and abdomen entirely smooth. Underneath the stigma is the usual whitish mark, shaped like a hammer.

Distinguished from *B. colpophorus*, Wesm., to which it comes nearest, by the longer antennæ, the testaceous margins of the abdomen, the somewhat lighter wings, and the colour of the legs.

Described from 4 females. Rannoch, Scotland; Hainault Forest; Pré Wood, near St. Albans. Bred by Brischke from capsules of *Campanula rapunculoides* and *persicifolia*, galled by *Gymnetron campanulæ*, L.

31. *Bracon otiosus*, n. s.

Ater, nitidus, palpis nigris, mandibulis abdomine pedibusque testaceis; segmenti 1mi disco, coxis, trochanterum basi, femorum anteriorum linea, terebræque valvis, nigris; tibiis apice, tarsisque totis, fuscescentibus. Alæ subfuscæ, stigmate nervisque fuscis, squamulis nigris. Corpus totum læve, nitidum. Terebra abdomine paulo brevior.

Deep black, shining; palpi black; mandibles, abdomen, and legs, testaceous; disk of segment 1, coxæ, base of trochanters, a line on the anterior femora, and valves of the terebra, black; apex of tibiæ, and all the tarsi, fuscescent. Wings pale fuscous, stigma and nervures darker, squamulæ black. Entire body smooth and shining. Terebra a little shorter than the abdomen. ♀. Length, 1¾; wings, 4 lin.

Antennæ 25-jointed, shorter than the body. Abdomen as long as the head and thorax; segment 1 rather longer than broad, tuberculated on each side of the base, testaceous, with a large, shining, elevated, black, apical spot; in one specimen entirely black; the rest of the abdomen bright testaceous; suturiform articulation hardly sinuated.

Described from 3 specimens in Fitch's collection. The abdomen is coloured as in *B. piger*, Wesm., Nouv. Mém. Ac. Brux., 1838, p. 48; but that species has black, stout legs, and the antennæ 32—33-jointed. Another nearly related species seems to be *B. palpebrator*, Ratz., Ichn. d. Forst., i., 47, pl. vii., f. 8, the face of which, below the antennæ, and the orbits, are testaceous.

32. *Bracon variator*, Nees.

Ichneumon guttator, Panz., F. G., xcii., 8 (not the fig.)
Bracon variator, Nees, Mon., i., 79, var. *c*; Ratz., Ichn. d. Forst., iii., 31.
Braco variator, Wesm., Nouv. Mém. Ac. Brux., 1838, p. 52, ♂ ♀.

Black, smooth and shining; abdomen elongate-ovate, rufo-testaceous, with a dorsal band of black variable spots; belly, and hind tibiæ at the base (seldom all the tibiæ), rufo-testaceous; head transverse, vertex narrow; wings blackish, with a subobsolete hyaline fascia; terebra ♀ as long as the abdomen, or a little longer. Length, ♂ 1—1½; wings, 2½—3½: ♀ 1¼—1¾; wings, 3—4 lin.

Antennæ ♀ 27—30-jointed, shorter than the body: mandibles testaceous or black, palpi always black. Metathorax and abdomen smooth. Segment 1 testaceous with a black scutum (sometimes partly testaceous); 2—7 testaceous, each more or less filled up with a black spot; that on the 2d is the smallest, and generally rounded, the following are rectangular and transverse, leaving always at least the lateral margins testaceous. Suturiform articulation straight. Legs black, with the knees, and base of the tibiæ (often only of the hind pair), rufo-testaceous. Second cubital areolet equal to the third, measured along the cubitus.

The ♂ is similar; antennæ (in two examples) 32-jointed.

It would serve no purpose to exhibit the numerous colour-varieties given by Nees, collected in various parts of Europe, and some of which may be suspected of belonging to different species. Those taken in England will be found in general to agree with the above diagnosis. The absence of rugosity, the black wings and legs, with the long terebra, are characters easily appreciated. *B. Roberti*, Wesm., looks like a large variety, but is distinguished by the rugosity of the 2d segment.

Described from 2 males and 5 females. Found on umbelliferous flowers, especially in the South of England; Isle of Wight, Dover, Milford Haven, London district, &c. Cameron has taken it in Cadder Wilderness near Glasgow. It is doubtful whether this *Bracon* is a parasite of certain small Curculios (*Cionidæ*), or of flies of the genus *Trypeta*. Reinhard bred var. *c.* of Nees from the swollen capsules of *Campanula teucrium* tenanted by *Gymnetron campanulæ*, L.; some emerged in autumn, and others in the following spring (Stett. Zeit., 1855, p. 105); Brischke and Giraud obtained it from the same source (Ratz., Ichn. d. Forst., iii., 31; Brischke, Schrift. nat. Ges. Danzig, n. s. v. 3, 136). In Holland it is said to have been bred from dried flower-heads of *Senecio*, and was supposed to be parasitic on a *Trypeta* (S. v. Voll., Pinac., p. 38). Other species of *Bracon* have been reared from *Trypeta* or its allies; thus Perris bred *B. flavator*, Fab. (?) from *Senecio aquatica*, inhabited by *Tephritis marginata*, Fall. (Ann. Soc. Fr. (5), iii., 72); Giraud records *B. nigripedator*, Nees, from *Urophora solstitialis*, L.; and Fitch once obtained a *Bracon*, now lost, from galls of *Centaurea* inhabited by the same fly.

33. *Bracon degenerator*, n. s.

Niger, nitidus; segmenti 1mi lateribus, pedibusque testaceis, coxis nigris, femoribus tibiisque posterioribus infuscatis; articulatione suturiformi late sinuata; alis fuscescentibus, litura obsoleta hyalina, anticarum nervo pobrachiali transverso vix interstitiali; terebra abdominis apice compressi trientem æquante.

Black, shining; sides of 1st abdominal segment, and legs, testaceous, coxæ black, posterior femora and tibiæ infuscated; suturiform articulation broadly sinuated; wings somewhat fuscescent, with an obsolete hyaline streak; pobrachial transverse nervure of the fore wings hardly interstitial; abdomen compressed at the apex; terebra $\frac{1}{3}$ of its length. ♀. Length, 1; wings, $2\frac{1}{2}$ lin.

Antennæ 28-jointed, as long as the body and the terebra together. Metathorax and abdomen smooth; the latter soft, shrivelled after death, leaving pale interstices between the segments, elevated posteriorly, compressed, and truncated. Four anterior tarsi at the apex, and hind tarsi altogether, fuscous. Pobrachial transverse nervure not exactly interstitial, subevected, showing a tendency towards the *Exothecides*. This, however, may be merely accidental.

One ♀ taken in Leicestershire.

34. *Bracon osculator*, Nees.

Bracon osculator, Nees, Mon., i., 84, ♂ ♀ and var. a ♀.
Braco bisignatus, Wesm., Nouv. Mém. Ac. Brux., 1838, p. 56, ♀; S. v. Voll., Pinac., pl. xxiv., f. 7 (male abdomen).

Black, shining; palpi blackish; mandibles, 1st abdominal segment at the sides, a streak at the basal angles of the 2d, the knees, and often the fore tibiæ entirely, flavo-testaceous. Wings fuscescent, stigma and nervures black. Body entirely smooth and shining. Segment 1 not margined, elevated in the middle. Terebra $\frac{1}{3}$—$\frac{1}{2}$ the length of the abdomen. ♂ ♀. Length, $1\frac{1}{3}$; wings, 3 lin.

I have not seen the ♂, which Nees in no way distinguishes from the ♀. Antennæ ♀ 25—27-jointed, as long as the body. Belly flavo-testaceous, with 2 or 4 round black spots near the base, and sometimes behind them 2 longitudinal black bands extending to the anal segment. The legs are variable; the fore tibiæ may be entirely, and the others more or less broadly at the base, testaceous. According to Nees and Wesmael, the abdomen during life exhibits pale sutures, and looks as if banded with black and yellow. The former writer also states that the 2d segment is obsoletely carinated, and has two faint punctures at the base,—characters which are not visible in the English specimens, nor noticed by Wesmael. The orbits are liable to be sometimes testaceous. The smooth abdomen and general aspect bring this species near to *B. variator*, Nees, but it has a much shorter terebra, longer and more slender antennæ, and the abdomen above entirely black, except the sides of the 1st segment. It also resembles *B. guttiger*, Wesm., in colour and size, but the abdomen of that species is not wholly smooth.

Bignell has taken 4 females in Devonshire. Wesmael possessed 5, captured near Brussels and in the Campine. W. H. B. Fletcher has bred a ♀ from *Coleophora cæspitella*, Zell.

35. *Bracon obscurator*, Nees.

Bracon obscurator, Nees, Mon., i., 83, ♂ ♀.
Braco obscurator, Wesm., Nouv. Mém. Ac. Brux., 1838, p. 55, ♀.

Black; smooth and shining; palpi blackish; mandibles, sides of segment 1, base of the belly, tibiæ more or less broadly at the base, and femora at the extreme apex, testaceous. Wings dusky hyaline, 2d cubital areolet not shorter than the 3d. Terebra shorter than the abdomen. ♂ ♀. Length, $\frac{1}{2}$—1; wings, $1\frac{3}{4}$—2 lin.

Antennæ ♀ 20—22-jointed, shorter than the body. Trochanters and femora sometimes dull testaceous, tibiæ of a clearer colour, the posterior tipped with black, and their tarsi blackish; or the legs are entirely blackish, with the extreme base of the hind tibiæ pale. Segment 2 is not absolutely smooth, but the aciculation is hardly visible, and the insect may well remain near its allies in this section, where it was placed by Wesmael. In one ♀ the terebra is rather longer; but still shorter than the abdomen. The ♂ is smaller than the ♀, with 23-jointed antennæ, but otherwise similar. This species much resembles *anthracinus*, Nees, and *atrator*, Nees, but the terebra is shorter, the 2d segment less shining, the wings more nearly hyaline, and the 2d cubital areolet not shorter than the 3d.

A ♀ in Fitch's collection was bred from *Œcophora fulviguttella*, Zell.; and Bignell reared both sexes together, May 28th, from *Homæosoma sinuella*, Fab.

36. *Bracon anthracinus*, Nees.

Bracon anthracinus, Nees, Mon., i., 81, ♀.
Braco anthracinus, Wesm., Nouv. Mém. Ac. Brux., 1838, p. 54, ♂ ♀.

Black, smooth and shining; mandibles, and lateral margins of segment 1, testaceous; wings fuscous at the base; 2d cubital areolet shorter than the 3d, measured along the cubitus; maxillary palpi very long; terebra ♀ as long as the thorax and abdomen. Length, ♂ ½—1; wings, 1¾—2: ♀ 1—1¼; wings, 2—2¾ lin.

Antennæ ♀ 18—21-, ♂ 18—23-jointed, and not longer than the body. The narrow testaceous margins of the 1st abdominal segment hardly visible in dried specimens; belly black, sometimes pale at the base; base of the hind tibiæ occasionally testaceous; wings sometimes hyaline. The ♂ only differs in wanting the terebra.

Described from 7 males and 11 females. Frequents umbelliferous flowers, and is generally distributed, extending into Scotland.

37. *Bracon atrator*, Nees.

Bracon atrator, Nees, Mon., i., 82, ♂ ♀.

Black, smooth and shining; mandibles piceous; abdomen oblong, very shining; an obsolete spot on each lateral margin of the 1st segment, and belly at the base, luteous; wings obscurely hyaline; terebra ♀ longer than the body. Length, 1 line.

Var. 1. Belly almost entirely, hind tibiæ at the base, and 2d joint of trochanters, rufous; wings obscure. ♂ ♀. Length, 1½ lin.

Var. 2. Sides of the abdomen at the base more broadly testaceous. ♀.

Var. 3. Antennæ ♀ shorter than the body, 19-jointed. ♂ similar; mandibles sometimes obscurely testaceous; antennæ 18-jointed in two examples, 15- in another. Length only ½ line. ? *Braco parvulus*, Wesm., Nouv. Mém. Ac. Brux., 1838, p. 55.

I am unable to speak with certainty of this species, the specimens I formerly possessed having perished. The females are distinguished from those of *anthracinus*, Nees, by the terebra, which is longer than the body. Taken in flowers, like the preceding, near Leicester.

38. *Bracon barypus*, n. s.

Ater, nitidus; mandibulis, abdominis medio, pedibusque rufis; palpis, coxisque posticis basi supra, fuscis; tarsorum articulo ultimo, præsertim posticorum, incrassato, nigro. Alæ fuscescentes, stigmate fusco utrinque testaceo, nervis fuscis. Terebra abdominis vix trientem superans, valvis crassioribus, pilosis, truncatis.

Deep black, shining; mandibles, abdomen in the middle, and legs, rufo-testaceous; palpi and hind coxæ above at the base, fuscous; last joint of all the tarsi, especially of the hind pair, incrassated, black. Wings fuscescent, nervures and stigma fuscous, the latter testaceous at both ends. Terebra scarcely longer than $\frac{1}{3}$ of the abdomen; valves stout, pilose, truncate. ♀. Length $1\frac{1}{2}$; wings, $3\frac{1}{4}$ lin.

Elongate, like a *Doryctes*. Head subhemispherical; antennæ as long as the body with the terebra, slender, filiform, 37-jointed: clypeus and mandibles testaceous, the latter tipped with black. Metathorax produced, carinated throughout its length, smooth and shining. Abdomen as long as the head and thorax, attenuated posteriorly, and subcompressed at the apex; segment 1 half as long again as its apical breadth, which is less than double that of the base, aciculated, bicarinated, the lateral margins not membranaceous, black; 2, 3, and base of 4, rufo-testaceous, 2 with a fuscous spot at the base; all the segments except the 1st smooth and shining; suturiform articulation subobsolete; thyridia of segment 2 distinct. Hind coxæ with a large fuscous basal spot above; the rest of the short, stout legs rufo-testaceous, except the last joint of the tarsi, which, together with the claws, is black, pale at the base: the fore tarsi have the last joint somewhat incrassated, the middle and hind pairs more strongly, resembling those of *Acrodactyla* among the *Ichneumonidæ*, and unlike any other *Bracon*. Wings narrow, fuscescent, squamulæ, nervures, and middle of the pale stigma, fuscous; stigma surrounded by a subtestaceous spot: 1st abscissa of the radius clouded with fuscous.

Notwithstanding its general appearance this is a true *Bracon*; the occiput is not margined, and the pobrachial transverse nervure is exactly interstitial. The incrassated tarsi distinguish it from all the preceding species.

My unique specimen was taken by sweeping herbage near Niton, Isle of Wight, July 26th, 1884.

II. EXOTHECIDES.

Pobrachial transverse nervure evected. Recurrent nervure rejected (except in *Bathystomus*). Suturiform articulation obsolete, segments 2—3 being connate (except in *Phanomeris*).

This division is formed of portions of the genera *Colastes*, Hal., and *Exothecus*, Wesm., the remaining species of which are are associated by Förster with the *Rhyssalides*. The character by which the *Exothecides* are separated from the *Braconides* is easy to be seen ; in the former the pobrachial transverse nervure is evected, in the latter, interstitial. From the *Rhyssalides* they are less obviously distinguished by the absence of a well-marked occipital margin, though in *Phanomeris*, according to Haliday, the occiput is *finely* margined. The species are few in number, only five being known to us as inhabiting England, all described by Haliday under *Colastes* ; but according to the Försterian system they now belong to four distinct genera.

TABLE OF GENERA.

(2) 1. Suturiform articulation distinct .. .. i. PHANOMERIS.
(1) 2. Suturiform articulation obsolete.
(4) 3. Radius originating beyond the middle of the stigma .. .. ii. XENARCHA.
(3) 4. Radius originating from the middle of the stigma.
(6) 5. Recurrent nervure evected .. .. .. iii. BATHYSTOMUS.
(5) 6. Recurrent nervure rejected .. .. .. iv. RHYSIPOLIS.

i. PHANOMERIS, Först.

Först., Verh. pr. Rheinl., 1862, p. 235.

Suturiform articulation distinct, sometimes crenate. Occiput scarcely, or not at all margined. Radius originating from the stigma somewhat before the middle. Pobrachial areolet of the hind wings less than one-half the length of the præbrachial. Mesothoracic sutures very fine, impunctate. Two species:—

Segment 2 aciculated at the base ; wings hyaline .. 1. *catenator*, Hal.
Segment 2 hardly aciculated at the base ; wings infumated .. .. 2. *fragilis*, Hal.

1. *Phanomeris catenator*, Hal. (Pl. I., fig. 2).

Colastes catenator, Hal., Ent. Mag., iv., 93, ♀ (1836).
Exothecus abnormis, Wesm., Nouv. Mém. Ac. Brux., 1838, p. 74, ♀.
? *Bracon dimidiatus*, Nees, Mon., i., 108, ♀.

Black, shining; antennæ at the base, palpi, legs (and lateral margins of the ♀ abdomen narrowly) pale testaceous; stigma fuscous; 1st abdominal segment, base of the 2d, and the suturiform articulation, rugulose; terebra ¼ of the abdomen. ♂ ♀. Length, 1½—1¾; wings, 3—3½ lin.

Head and thorax smooth, shining, with whitish pubescence. Antennæ about 33-jointed, fuscous, testaceous at the base. Metathorax thickly punctulate, pubescent, with some smooth spaces. Abdomen oblong-ovate, somewhat pitchy-black, a little longer, but hardly wider, than the thorax: segment 1 obconic, longer by about one-half than its breadth at the apex, the tubercles minute, medial, rugulose, with a longitudinal carina which is bifurcate in front: the other segments shorter, slightly decreasing in length; 2d rugoso-striated at the base, the lateral and hind margins smooth; 3d and following smooth, ciliated before the apex with whitish hairs; lateral margins of segments 2—5 testaceous in one example, in another piceous; tarsi at the apex, and hind tarsi entirely, subfuscous; wings hyaline, squamulæ ferruginous, nervures paler than the fuscous stigma. ♂ smaller; abdomen linear, piceous in the middle of the disk; antennæ 34-jointed.

Taken by Haliday in Ireland, and by Walker in England. I captured the male and 2 females at Nunton, Wilts. Bred by Brischke from *Phænusa rubi*, Zadd.

Wesmael's description of *Exothecus abnormis* agrees sufficiently with the above, except that the terebra is stated to be equal to about one-sixth of the abdomen. There appears nevertheless little doubt that both he and Haliday had the same species under observation. Nothing hinders this from being *Bracon dimidiatus*, Nees, except the colour of the abdomen, which Nees states to be rufous on its apical half. The specimens taken in England have the abdomen inclining to piceous, and may possibly be merely a dark variety. In Ruthe's collection *B. dimidiatus*, Nees, is doubtfully identified with *E. abnormis*, Wesm.

2. *Phanomeris fragilis*, Hal.

Colastes fragilis, Hal., Ent. Mag., iv., 56, ♀.

♀. Black; palpi and legs dull testaceous; wings infumated; terebra very short. ♂. Hind coxæ, femora above in the middle, tibiæ at the tips, and tarsi, infuscated; segment 2 striolated at the base. ♂ ♀. Length, 1½; wings, 2½ lin.

♀. "Head a little narrower than the thorax, subglobose, very smooth; antennæ about as long as the body, slender, 24-jointed; thorax elongate, attenuated before and behind; prothorax narrow; mesothorax very smooth, the sutures rudimentary; metathorax somewhat scabrous; abdomen oblong, lanceolate, 1st segment very short, somewhat scabrous, or roughened with punctures, not carinated; the remaining segments very smooth, fusco-piceous; terebra very briefly exserted; legs ochreous; wings narrow, infumated, stigma and nervures fuscous, the former elliptical, lanceolate, receiving the radius in the middle; præ- and pobrachial nervures approximated in the middle; pobrachial areolet of the hind wing shorter than ½ the præbrachial."—Haliday.

The ♂ has 31-jointed antennæ; mesothoracic sutures almost obsolete; metathorax with a few minute wrinkles, very shining; abdomen black. Sides of segment 1, and suturiform articulation pale; wings slightly infumated, as in no other allied species. Occiput not visibly margined. Suturiform articulation distinct, not crenate. Legs sometimes marked with fuscous. Otherwise like the ♀.

The Försterian genera being often so constructed as to admit but one species, it is difficult to refer to its place any form with which he was not acquainted. The present insect seems best to agree with *Phanomeris*, on account of the distinct suturiform articulation.

The ♀ was taken near London by Walker. A ♂ by Fitch in the New Forest, and two more by Bignell in Devonshire.

ii. XENARCHA, *Först.*

Först., Verh. pr. Rheinl., 1862, p. 235.

Suturiform articulation obsolete. Head protuberant at the base of the antennæ. Mesothoracic sutures distinct, punctulate. Radius originating beyond the middle of the stigma.

1. *Xenarcha lustrator*, Hal. (Pl. I., fig. 3).

Colastes lustrator, Hal., Ent. Mag., iv., 58, ♂.

Black; the palpi and legs pale yellow; abdomen fuscous, testaceous in the middle; stigma large, elliptical, blackish, emitting the radius between the middle and the apex. ♂. Length, 1¼; wings, 2⅓ lin.

Head black, very shining, the front slightly protuberant: antennæ rather longer than the body, 29-jointed, fuscous, paler at the base: mesothoracic lobes well marked, convex, the sutures punctulate; metathorax punctulato-rugulose, with an inchoate carina at the base: abdomen as long as the head and thorax, depressed, widest at the base of the 2d segment: 1st segment fuscous, a little longer than its width, longitudinally striolated, the margins flavescent at the apex (not in my specimen); 2d and 3d segments of equal length, the former striolated like the 1st, and fuscous above; the place of the suturiform articulation is denoted by a smooth transverse impression; apex of segment 2, and segments 3—4 entirely, testaceous, the remainder pitchy: tarsi fuscous at the apex: wings hyaline.

One ♂ taken in North Ireland by Haliday, another by me in the New Forest, and a third in Leicestershire. Considerably resembles a male *Bracon*, but must be carefully distinguished by structure. The occiput is almost invisibly margined, again showing the insufficiency of this character for systematic division.

iii. BATHYSTOMUS, *Först.*

Först., Verh. pr. Rheinl., 1862, p. 235.

Suturiform articulation obsolete. Recurrent nervure inserted in the 2d cubital areolet; radius springing from the middle of the stigma: pobrachial areolet of the hind wing half the length of the præbrachial. Mesothoracic sutures obsolete. Third joint of the palpi minute, as in *Rhyssalus*.

1. *Bathystomus funestus*, Hal. (Pl. I., fig. 4).

Colastes funestus, Hal., Ent. Mag., iv., 93, ♂.

♂. Black; palpi and legs pitchy-testaceous. Wings subhyaline, stigma and nervures fuscous. First abdominal segment bicarinated. ♀. Disk of mesothorax, abdominal segments 1—2, and the others at the hind margins, rufo-testaceous; lateral margins of segment 2 blackish. Length, ♀ 1½; wings, 3 lin.

Antennæ ♂ 32-jointed, in Haliday's specimen, as long as the body; of the ♀ hardly shorter, 34-jointed; head and thorax very finely punctulate, pubescent; metathorax obsoletely areated; abdomen obovate, segment 1 angulated at the base, from thence to the apex nearly linear, one-half longer than its width, with two carinæ slightly convergent posteriorly, the interstices punctulate, and the apical angles with a membranaceous margin: segment 2 ♂ punctulate at the base; the rest smooth, shorter: legs ochraceous or subfuscous: stigma large, ovate-lanceolate, emitting the radius from about the middle.

A single ♂ taken in England by Walker. The ♀, in Fitch's collection, exhibits differences of colour, but there is little doubt that it belongs to this species.

iv. RHYSIPOLIS, *Först.*

Först., Verh. pr. Rheinl., 1862, p. 235.

Suturiform articulation obsolete. Radius springing from the middle of the stigma: recurrent nervure inserted in the 1st cubital areolet: pobrachial areolet of the hind wing hardly longer than ⅓ of the præbrachial. Terebra short, exserted.

1. *Rhysipolis meditator*, Hal. (Pl. I., fig. 5).

Colastes meditator, Hal., Ent. Mag., iv., 56, ♂.

Black; palpi and legs ferruginous; stigma fuscous; abdomen brown, the 1st segment black: præbrachial transverse nervure in the hind wings wanting. ♂ ♀. Length, 1¾; wings, 3½ lin.

Head almost hemispheric, as broad as the thorax: antennæ ♂ 31-jointed, as long as the body: thorax elongate, attenuated in front and behind, shining, with scattered pubescence; metathorax thinly rugoso-reticulated, indistinctly areated, the intermediate areolet not penetrating between the two dorsal: abdomen linear, gradually attenuated towards the base: 1st segment one-half longer than its apical width, at the base only half as wide as at the apex, the tubercles placed a little before the middle; two acute longitudinal carinæ coalesce in the middle of the disk, and continue thence to the apex; the rest of the surface is shining, and minutely rugulose: the other segments are smooth, brown, with darker hind margins: legs elongate, pubescent, ferruginous: wings subhyaline, radix and squamulæ ferruginous, nervures and stigma brown, the latter oblongo-lanceolate: pobrachial areolet of the hind wing hardly longer than ⅓ of the præbrachial. Terebra shorter than ½ abdomen.

The ♂ was taken once near London by Walker; a ♀ in bad condition is in my collection.

III. RHYSSALIDES.

Head transverse, occiput faintly margined. Abdomen short, subpetiolated, suboval or spathuliform; thyridia of segments 2, 3, inconspicuous; suturiform articulation superficial. Three cubital areolets, the 2d trapeziform, the 1st intercubital nervure being very oblique; recurrent nervure interstitial, or (in *Colastes*) slightly rejected; pobrachial transverse nervure evected; anal nervure not interstitial. Terebra elongate.

It will be seen that these characters are the same as those of the *Exothecides*, with the exception of the occipital margin, which, however, is very indistinct. The separation of the two groups is perhaps unnecessary; at all events the interpolation between them of such dissimilar forms as *Spathiides*, *Rhogadides*, &c., in Förster's table, does not tend to distinctness. The *Rhyssalides* make a somewhat near approach to *Clinocentrus*, from which they are best distinguished by the absence of rugosity on the abdomen.

The few British species are of weak structure and obscure colours. One of them is remarkable in its habits, being an *external* parasite of lepidopterous larvæ. The three genera here adopted were united by Wesmael under *Exothecus*, and separated by Haliday into *Rhyssalus* and *Colastes*, of which latter *Oncophanes* is a further section established by Förster.

(2) 1. Hind tarsi shorter than their tibiæ, the latter incrassated in the ♂. Metathorax completely areated .. .. i. Rhyssalus.
(1) 2. Hind tarsi not shorter than their tibiæ, the latter simple in both sexes. Metathorax not areated, or with only a medial bifid carina.
(4) 3. Recurrent nervure rejected .. .. .. ii. Colastes.
(3) 4. Recurrent nervure interstitial .. .. .. iii. Oncophanes.

i. Rhyssalus, *Hal.*

Hal., Ent. Mag., i., 266; iv., 53.

Metathorax with a medial elongate area, and two on each side. Post-scutellum armed with a conical tubercle. Abdomen short, subpetiolated, deltoid or spathuliform; 1st segment margined, sculptured, the rest smooth. Femora subclavate; hind tibiæ in the ♂ incrassated, except at the base; tarsi ♂ ♀ short, the 3d pair not longer than the 1st and 2d, distinctly shorter than their tibiæ, the 1st joint in the ♀ subincrassated, as long as the three following joints. Radius originating somewhat beyond the middle of the stigma; recurrent nervure interstitial; præ- and pobrachial nervures more approximated than usual. Terebra subelevated.

(2) 1. Second abscissa of the radius twice as long as the first; stigma incrassated; colour uniform, pitchy-black	2. *indagator*, Hal.
(1) 2. Second abscissa of the radius about 4 times longer than the first; stigma attenuated; colour pitchy, partly testaceous	1. *clavator*, Hal.

1. *Rhyssalus clavator*, Hal.

Rhyssalus clavator, Hal., Ent. Mag., iv., 53, ♂ ♀.

Piceous; anterior half of the abdomen, antennæ at the base, and legs, testaceous; stigma fulvescent, attenuated; hind tibiæ of the ♂ clavate, fuscous; terebra as long as the body without the head. Length, 1—1¾; wings, 2—3½ lin.

Antennæ ♀ 25—26-jointed, hardly longer than the body. Mesothoracic sutures punctulate, meeting in a rugulose fovea. Medial area of the metathorax extending to the base. Abdomen deltoid, compressed, truncate at the apex; segment 1 stouter than that of the ♂; 2, 3, and 4 at the base, fulvescent; the rest fuscous except the two last, which are ferruginous. Femora subclavate. Wings subhyaline, narrower than in the other species; stigma attenuated; 2d cubital areolet differently shaped, the side formed by the 2d abscissa of the radius being equal in length to the first intercubital nervure; pobrachial areolet of the hind wing scarcely longer than ⅓ of the præbrachial.

Antennæ ♂ 25—33-jointed (in my specimen 27-jointed), half as long again as the body. Abdomen spathuliform, depressed; 1st segment three times longer than broad, the tubercles placed before the middle, shining, rugulose, the margins raised, and defined interiorly by an impressed line, testaceous; the rest piceous, becoming darker towards the apex. Clavate hind tibiæ fuscous except at the base.

I have taken both sexes at Barnstaple, but only the ♂ now remains.

2. *Rhyssalus indagator*, Hal. (Pl. I., fig. 6).

Rhyssalus indagator, Hal., Ent. Mag., iv., 54, ♂ ♀.
Exothecus tuberculatus, Wesm., Nouv. Mém. Ac. Brux., 1838, p. 82, ♂ ♀.

Pitchy-black; legs testaceous, hind femora (and in the ♂ the clavate hind tibiæ) fuscous, except at the base; terebra as in the preceding. Length, 1½—2; wings, 3¼—3¾ lin.

Larger and darker than *clavator*; the wings broader in proportion, fuscescent; stigma broader, fuscous. The 2d cubital areolet has the side formed by the 2d abscissa of the radius much shorter than the 1st intercubital nervure. Pobrachial areolet of the hind wing equal to ½ the præbrachial. Antennæ ♂ 28—30-, ♀ 24—25-jointed; the numbers 39 and 33 in the Ent. Mag. are undoubtedly misprints. A ♀ taken by Bridgman July 27th at Earlham, near Norwich, has the stigma unusually narrow, but not like that of *clavator*, and the hind femora testaceous. Sometimes the antennæ and 1st abdominal segment are also pale.

Not uncommon in old hedges: taken by Fitch at Maldon: by me at Bishop's Teignton, Devon, and St. Albans; also a fine series near Abergavenny.

ii. COLASTES, *Hal.*

Hal., Ent. Mag., i., 266; iv., 55; Först., Verh. pr. Rheinl., 1862, p. 241.

Post-scutellum unarmed. Metathorax not areated; with a medial bifid carina. Antennæ and legs long and slender; femora and tibiæ simple in both sexes; hind tarsi at least as long as their tibiæ. Abdomen subpetiolated, ovate, depressed; suturiform articulation obsolete. Terebra exserted. Radius originating before the middle of the stigma; recurrent nervure rejected or interstitial; podiscoidal areolet shorter than the prædiscoidal.

(2) 1. Margin of the occiput fringed with long whitish hairs .. .. 2. *hariolator*, Hal.
(1) 2. Margin of the occiput not fringed.
(4) 3. Stigma fuscous, 3 times longer than broad, emitting the radius just before the middle; 2d cubital areolet simple in both sexes .. 1. *decorator*, Hal.
(3) 4. Stigma yellow, 4 times longer than broad, emitting the radius before ⅓ of its length; lower side of the 2d cubital areolet incrassated in the ♂ .. .. 3. *braconius*, Hal.

1. *Colastes decorator*, Hal. (Pl. II., fig. 1).

Colastes decorator, Hal., Ent. Mag., iv., 92, ♀.
Exothecus ruficeps, Wesm., Nouv. Mém. Ac. Brux., 1838, p. 78, ♂ ♀, pl., fig. 9 (wing).

Testaceous; antennæ at the base, palpi, and legs, ochreous; stemmaticum, thorax, and 1st abdominal segment black; the rest of the abdomen piceous; terebra ⅔ the length of the abdomen. Length, 2; wings, 4½ lin.

The distribution of the colours is variable. Antennæ ♀ as long as the body, 38—40-jointed, fuscous above, rufescent beneath, paler at the base. Head rufo-testaceous, tinged laterally behind the eyes with fuscous. Prothorax black above; mesothorax the same, or with a testaceous central patch. Hind margins of the abdominal segments fuscous; segment 2 sometimes partly, and the anal segment generally, testaceous. Hind tibiæ and tarsi fuscescent at the apex. Stigma fuscous. Head wider than the thorax, occiput not ciliated, ocelli salient; mesothoracic sutures impunctate, converging into a smooth fovea; metathorax smooth, shining, with a medial bifurcate carina; segment 1 about twice as long as its breadth, gradually narrowed towards the base, punctato-rugulose, the other segments smooth, the 4th and following margined behind; pobrachial areolet of the hind wing less than ½ the length of the præbrachial. The ♂, not known to me, is described by Wesmael as similar, but the number of joints in the antennæ is not stated. Antennæ after death convoluted at the apex.

Taken by Haliday among felled oaks, at the Cartland Craigs, Scotland; and twice lately near Plymouth by Bignell. Wesmael had 5 females and 1 male from Brussels and Liége. According to Giraud a parasite of *Ortalis connexa*, Fab., bred from the fruit of *Cynanchum vincitoxicum*—an exotic Asclepiad—is doubtfully referable to *Exothecus ruficeps*, Wesm. (*cf.* Verh. z.-b. G. Wien, 1861, p. 490).

2. *Colastes hariolator*, Hal.

Colastes hariolator, Hal., Ent. Mag., iv., 92, ♀.
Exothecus barbatus, Wesm., Nouv. Mém. Ac. Brux., 1838, p. 79, ♂ ♀.

Very like the preceding, but smaller; the head is less transverse or more cubical, and the margin of the occiput ciliated with long whitish hairs. Testaceous, antennæ at the base, palpi, and legs, ochreous; head, mesothorax more or less, metathorax, and 1st abdominal segment, black; terebra ⅔ the length of the abdomen. Length, 1½; wings, 3½ lin.

Antennæ ♀ 33—40-jointed; occiput distinctly margined and ciliated, especially in the middle between the eyes. The colours are inconstant. The ♂ is like the ♀.

Var. ♀. Head and thorax entirely black. Hind coxæ at the base, femora at the apex, and tibiæ except at the base, fuscous.

In a wood near St. Albans I took a ♀ with the pro- and mesothorax testaceous, and another at Bishop's

Teignton. Bignell has captured four specimens near Plymouth, one of which is the dark variety. The species was founded on a single example taken by Walker in England; Wesmael possessed three males and eight females from the environs of Brussels.

3. *Colastes braconius*, Hal.

Colastes braconius, Hal., Ent. Mag., iv., 57, ♂ ♀.
Exothecus debilis, Wesm., Nouv. Mém. Ac. Brux., 1838, p. 75, ♂ ♀, pl., fig. 8 (wing ♂ ♀); Ratz., Ichn. d. Forst., ii., 45, pl. ii., fig. 12 (wing ♀); iii., 42, ♂ ♀.

Black; antennæ at the base, palpi, and legs, pale; abdomen in the middle indeterminately testaceous; stigma elongate, lanceolate, yellow, emitting the radius much before the middle; lower side of the 2d cubital areolet incrassated in the ♂; recurrent nervure almost interstitial; terebra ¼—⅓ the length of the abdomen. Length, ¾—2; wings, 1—4½ lin.

Variable in size and colour. Head subglobose, narrower than the thorax; antennæ slender, 27—31-jointed. Mesothoracic sutures converging into a wide rugulose depression; metathorax punctulate, pubescent, not areated, often with a smooth space in the middle and a faint longitudinal carina. Abdomen of the ♂ linear; of the ♀ elongate-ovate, segment 1 obconic, longer than its apical breadth, striolated, sometimes with a medial carina, and two contiguous foveæ placed transversely behind the middle; the rest of the abdomen smooth and shining. Legs slender. Wings hyaline; radius originating from the yellowish stigma before ⅓ of its length; præ- and pobrachial nervures approximated; pobrachial areolet of the hind wing rather less than ½ the præbrachial.

Var. *α*. Small. (Length, ¾—1; wings, 1⅔—2⅓ lin.). Antennæ 22—24-jointed. Piceous, the middle of the abdomen paler, legs almost whitish; sculpture of the metathorax and 1st segment very minute.

Var. *β*. Larger. (Length, 1¾; wings, 3⅔ lin.). Antennæ 30-jointed. Head, thorax, and 1st segment black, 2—4 testaceous, the rest fuscous.

Var. *γ*. Largest. (Length, 2; wings, 4½ lin.). Abdomen, after the 2d segment, fulvescent. Taken by Bignell and myself.

A common solitary parasite of leaf-mining Lepidoptera and Diptera. Its fragile form, long, folded wings, pale legs, and slow movements, give it a very gnat-like appearance. Bred by Reissig in April, and by Ratzeburg in July, from beech-leaves (Buchenlaube), mined by a *Tinea* which Ratzeburg calls *Lithocolletis cavella*, Zell., but as this feeds on birch the species intended may be *L. tristrigella*, Haw. Obtained by Nicelli from *L. querci-foliella*, Fisch. In England by Dorville, Barrett, and Elisha, from *L. lautella*, Zell.; by Elisha, March 14th, from *L. tenella*, Zell.; and by Fletcher, May 9th, from *Tischeria dodonæa*, Heyd. Prematurely forced at the end of February by Elisha from *Lithocolletis Bremiella*, Zell., *lautella*, Zell., *cavella*, Zell., and *Nepticula aucupariæ*, Frey; March 20th from *L. Cramerella*, Fab.; and April 27th from *L. lantanella*, Schr. At Cambridge bred by Warren from *Ornix betulæ*, Staint. It does not confine its attacks to Lepidoptera, having been reared by Reissig and Nördlinger from *Orchestes fagi*, L., and from dipterous leaf-miners, as *Phytomyza nigricornis*, Macq. Brischke reports it from a *Phytomyza*, and also from *Cryptocampus bellus*, Zadd. Inchbald and Fitch have bred it from a fly mining the leaves of *Symphoricarpus*; and the latter on July 17th from *Phytomyza lonicerœ*, Desv., in the leaves of honeysuckle. The diversity of food may account for the differences of size and colour in these parasites.

iii. ONCOPHANES, *Först.*

Först., Verh. pr. Rheinl., 1862, p. 241.

Third joint of the labial palpi united with the 4th. Metathorax areated. Abdomen subsessile, ovate; terebra exserted, decurved. Radius originating rather beyond the middle of the stigma, which is angulated, not rounded, at the point of origin; recurrent nervure interstitial; pobrachial areolet of the hind wing longer than the præbrachial.

1. *Oncophanes lanceolator*, Nees. (Pl. II., fig. 2).

Bracon lanceolator, Nees, Mon., i., 92, ♂ ♀ (nec Fab.).
Colastes lanceolator, Hal., Ent. Mag., iv., 58, ♂ ♀.
Exothecus minutus, Wesm., Nouv. Mém. Ac. Brux., 1838, p. 83, ♂ ♀.
? *Exothecus lævigatus*, Ratz., Ichn. d. Forst., iii., 43, ♂.
Oncophanes, S. v. Voll., Schets., ii., tab. 5.

Black; antennæ at the base, palpi, and legs, testaceous; stigma yellowish; abdomen, after the 1st segment, piceous, often indeterminately testaceous in the middle, segment 1, and 2 at the base, rugulose; hind tibiæ stout, subsinuated, whitish towards the base; terebra as long as ½ the abdomen. Length, 1—1½; wings 2⅓—3½ lin.

Shorter and stouter in proportion than any of the preceding, and with fewer joints in the antennæ. Those of the ♀ are not longer than the body, 20—24-jointed; of the ♂, longer than the body, 24—30-jointed; fuscous, pale at the base. Mesothoracic sutures impunctate, converging to a punctate pubescent depression before the scutellum. First abdominal segment hardly narrower at the base, ½ longer than its apical breadth, rugulose; segments 2 and 3 broadest, smooth and shining, the former more or less striolated at the base, the remaining segments short, and rapidly decreasing in width to the apex; segment 2 often more or less ferruginous. Legs either wholly testaceous, or the hind coxæ at the base, and the 2d and 3d pairs of femora and tibiæ more or less, fuscous. The sexes are similar.

Not uncommon in England; found at Hastings, St. Albans, Maldon. Taken by Haliday also in the Hebrides, and rarely in Ireland. Bred by Bignell from *Tortrix viridana*, L.; the two females thus obtained had the 2d segment marked with a testaceous spot. Ratzeburg records the species as a parasite of *Recurvaria* (*leucatella*, Clerck?) living *externally* upon the body of the larva, a fact not noticed in connection with *Tortrix viridana*. Brischke's observation is here translated from Ratz., *lib. cit.*, iii., 43:—

"On May 28th I found on a service-tree [*Pyrus domestica* or *aucuparia ?*], between leaves fastened together by a web, some small caterpillars, probably of *leucatella* or some other *Tinea*. One of these was being sucked by three parasitic larvæ, placed externally, two on the 7th and one on the 9th segment. The parasites were ⅓ line long, translucent, and orange coloured on the posterior half, most likely from the copiously absorbed juices of the caterpillar. The latter was 5—6 lines long; it remained motionless, although still quite vigorous. On May 30th the parasites were ½ line long; they had changed their positions; and now a fourth was to be seen, which before had probably been sucking on the under side of the caterpillar. On the 31st their length had increased to 1 line, and the colour was now more reddish. The caterpillar had shrunk to 4 lines in length. Finally, on June 1st, when the parasites were 1½ lines long, and exhibited lateral rows of tubercles, three of them quitted the body of the caterpillar, and began to crawl about. Towards noon they commenced spinning white cocoons, and on the 10th appeared the first ichneumon, which was soon followed by the others. The cocoons are of a very thin texture and, lying close together, they are flattened at the sides by mutual pressure. The egg-state lasts about eight days; the larva is full-fed in four or five days; and the imago appears after eight or nine days more. So that the entire development of the insect is accomplished in less than a month." Reissig obtained the ♂ from a similar cocoon found between elm-leaves. The fact of external parasitism is confirmed more recently by Brischke, Schrift. nat. Ges. Danzig, n. s. V., iii., 136.

IV. SPATHIIDES.

Several singular exotic forms belong here, but the only British genus is

Spathius, *Nees.*

Nees, Act. Ac. L. C., 1818, p. 301; Mon. i., 11.

Head cubical; occiput margined. Maxillary palpi 5-, labial 3-jointed. Antennæ long and slender. Abdomen depressed, ovate, with a long petiole; segment 1 nearly as long as the rest taken together; 2—3 connate, forming about one-sixth of the remainder of the abdomen; suturiform articulation obsolete. Terebra elongate. Cubital areolets 3, the 2d subpentagonal, its interior posterior angle much produced, receiving the recurrent nervure; anal nervure interstitial.

This well-known genus has a considerable literature, and may be found described at great length in Nees, *l. c.*, and Haliday, Ent. Mag., iv., 41—3. The two British species are thus distinguished:—

Wings fuscous with 3 white bands; petiole as long as ⅔ of the rest of the abdomen; terebra not longer than the abdomen .. .. 1. *rubidus*, Rossi.

Wings subfuscous with 2 darker bands; petiole nearly as long as the rest of the abdomen; terebra much longer than the abdomen .. .. 2. *exarator*, L.

1. *Spathius rubidus*, Rossi. (Pl. II., fig. 3).

Ichneumon rubidus, Rossi, Mant., App., ii., 110.

Spathius rubidus, Nees, Mon., i., 14 ; Hal., Ent. Mag., iv., 42, ♂ ♀.

Rufo-testaceous; abdomen (except segment 1) black or blackish; tibiæ white at the base, hind tibiæ annulated with fuscous; coxæ and tarsi more or less pale. Wings fuscous, white at the base and apex, and with a white fascia beneath the bicolorous stigma. Terebra nearly as long as the abdomen. ♂ ♀. Length, 1—2; wings, 1½—3¼ lin.

Antennæ longer than the body, of the ♀ 29-, of the ♂ 31-jointed (in one specimen); front impressed and transversely striolated. Thorax less shining than the head, coriaceous. Segment 1, and base of 2, finely striolated; the rest smooth. The colours vary; small specimens often have the thorax and petiole infuscated, and the markings of the wings and legs subobsolete.

Less common than the next species. I captured a ♀ on an elm tree near Esher, another among larches in Pré Wood, St. Albans, and ♂ ♀ out of an old hedge near Abergavenny. Bridgman has taken two fine typical females near Norwich. Their parasitism has not been well traced ; Giraud supposes them to infest *Xiphydria dromedarius*, Fab., which seems unlikely. *Spathius anobii*, Gir., Ann. Soc. Fr., 1877, p. 415, bred by Perris from *Anobium longicorne*, Sturm, is very like this species, and conjectured by Perris to be identical. *S. erythrocephalus*, Wesm., Nouv. Mém. Ac. Brux., 1838, p. 131, ♂ ♀, differs only in having segment 2 very smooth, and may also be the same; it has been bred by Wissman from *Ochina ptinoides*, Marsh. *S. pedestris*, Wesm., is an apterous form from Louvain, of which Wesmael had only one specimen.

2. *Spathius exarator*, L.

Ichneumon exarator, Lin., F. S., 1614, ♀.

Cryptus clavatus, Panz., F. G., cii., 16, ♂, badly figured.

Spathius clavatus, Nees, Mon., i., 12 ; Hal., Ent. Mag., iv., 43 ; Wesm., Nouv. Mém. Ac. Brux., 1838, p. 129, pl., fig. 16 (wing) ; Ratz., Ichn. d. Forst., i., 48, pl. vii., fig. 10; ii., 42 ; iii., 41, ♂ ♀ ; S. v. Voll. Schets., ii., tab. 5, ♀.

Testaceous, varied with fuscous; palpi, fore coxæ, all the trochanters, and tibiæ at the base, whitish, the last obscurely annulated with fuscous. Wings subfuscous, indeterminately clouded with a darker tint before and underneath the bicolorous stigma. Terebra as long as the body. ♂ ♀. Length, 1¼—3¼; wings, 2¾—6 lin.

Longer and usually larger than the preceding; the colours more dingy; antennæ ♂ ♀ 29—38-jointed; petiole and terebra much longer.

The Linnean name of this insect is here restored. There are two females in the Linnean cabinet labelled in that author's handwriting. The species is common throughout Europe, attacking *Anobium pertinax*, L., *striatum*, Ol., &c., which perforate old woodwork. I obtained a fine series from a hovel, well known to some entomologists, at Camachgouran, near Loch Rannoch. The female raises the abdomen so as to bring the terebra into a vertical position, and explores the burrows of the beetles with the inserted instrument. If disturbed in this operation she will not fly off, and may be captured with the fingers. A similar mode of action is employed by *Ephialtes*, and other Ichneumons with a prolonged ovipositor. Reared by Bouché, Boie, Reinhard, and Brischke from *Anobium striatum*, Ol. By Giraud from *Ptilinus pectinicornis*, L.; and I procured many in Devonshire from the same beetle. Van Vollenhoven reports it as a parasite of *Hylosinus fraxini*, Fab. According to Ratzeburg it also attacks *Orchestes quercus*, L., having been reared in June from oak-leaves collected the year before for the purpose of breeding the Curculio; these leaves had been carefully separated from the twigs, so that no xylophagous Coleoptera could be found among them. The *Spathius* thus obtained must have been very small, and the fact is so contrary to its habits and structure as to be liable to suspicion. Its accidental presence among the oak-leaves is much more probable. Further observations on the parasitism of this species are desirable, for it seems impossible that a full-sized *Spathius*, nearly 3 lines long exclusive of the terebra, could be nourished within the body even of the largest *Anobium*. A still stranger fact recorded by Ratzeburg is the rearing of *S. exarator* by Nördlinger from the lepidopterous *Sericoris ? Nördlingeriana*, Ratz., and *Coccyx Mulsantiana*, Ratz., both pupating in cases made of the leaves of *Pinus pinaster*.

V. HECABOLIDES.

Established by Förster to include those forms of the Cyclostomi which have only two cubital areolets. Of the ten genera enumerated (Verh. pr. Rheinl., 1862, p. 236) only five refer to described types; the others must be consigned to the limbo of MS. names. After the subtraction of *Pambolus*, which appears too widely aberrant to find a place here, there remains, belonging to the British Fauna, the single genus—

HECABOLUS, *Cur.*

Cur., B. E., 507 (1834); Hal., Ent. Mag., iv., 48 (1836).

Head cubical; abdomen subsessile, the segments discrete, sutur-iform articulation faintly marked; terebra ♀ elongate; fore wings with two cubital areolets; hind wings of the ♂ with a stigma near the base; the recurrent nervure, but not the anal, interstitial.

1. *Hecabolus sulcatus*, Cur. (Pl. II., figs. 4, 4*a*).

Hecabolus sulcatus, Cur., B. E., pl. dvii; Hal., Ent. Mag., iv., 48; Ratz., Ichn d. Forst., ii., 34, pl. ii., fig. 11 (wings ♂); iii., 32; S. v. Voll., Schets., ii., tab. 5 (where the striolæ on the base of the 3d segment are not represented).

Anisopelma Belgicum, Wesm., Nouv. Mém. Ac. Brux., 1838, p. 134, pl., fig. 17 (wing), ♀.

Black, the abdomen pitchy; palpi pale; antennæ at the base, and legs, testaceous; femora, tibiæ in the middle, and hind coxæ, more or less fuscous; intermediate tarsi very short; abdominal segments 1—2 depressed, and, together with the basal half of the 3d, striolated longitudinally, the rest of the abdomen smooth wings hyaline, stigmata fuscous; terebra ♀ longer than the body Length, 1—$2\frac{2}{3}$; wings, $1\frac{1}{2}$—$3\frac{1}{2}$ lin. ♂ ♀.

Antennæ ♀ shorter than the body, 19—26-jointed; of the ♂ hardly as long as the body, 21-, 22-, 25-jointed, in 3 examples.

The abdomen of the ♀ is clavate, of the ♂ linear-lanceolate. The stigma of the hind wings in the ♂ almost fills up the costal and præbrachial areolets, and is about half the size of the fore-stigma: no other British Braconid possessing this character is at present known. Like other parasites of xylophagous insects, it varies much in size; the ♂ is always smaller than the ♀.

Parasitic on *Ptilinus pectinicornis*, L., and may be taken on old posts and rails perforated by that insect. My specimens are from Cheltenham and Leicester. Others are from Fulham, Maldon, Norfolk, and Yorkshire. According to Ratzeburg also reared from *Ochina ptinoides*, Marsh., by Nördlinger; and by Hartig and Perris from *Ptilinus costatus*, Gyll., in old willow-trunks.

VI. PAMBOLIDES.

Head transverse, occiput margined; abdomen sessile (or petiolated), with only two apparent segments, the suturiform articulation being effaced, and the 4th and following segments retracted beneath the 3d; ♂ apterous or winged, in the latter case with two cubital areolets, the anal nervure interstitial (*cf.* Subfam. VIII.); ♀ apterous, the terebra exserted.

This curious group is distinguished from most others by the biarticulate structure of the abdomen. It is included among the *Hecabolides* by Förster (Verh. pr. Rheinl., 1862, p. 237), but as it has little in common with that section except the number of cubital areolets, I prefer for the present to consider it as a separate subfamily, including 3 genera, *Pambolus*, Hal., *Arrhaphis*, Ruthe, and *Dimeris*, Ruthe. The two first genera are not yet known as indigenous; *Dimeris* is represented by a few females. *Arrhaphis*, Ruthe (Stett. Zeit., 1854, p. 346) differs from the other two in having the abdomen petiolated, and the author remarks that it should stand next to *Calyptus*, Hal. (*Brachistes*, Wesm.) among the Cyclostomi, though in his collection it is associated with *Dimeris*. The identity of *Pambolus* ♂ with *Dimeris* ♀ is maintained by Förster (*lib. cit.*, p. 282); but this is not in accordance with the observations of Fitch, who in 1883 inspected Ruthe's collection, just before its removal to South Kensington, with a view to the settlement of this question, and found it to contain several allied and unpublished species, including males of *Dimeris* diverse from *Pambolus*. Without confidently asserting that the two genera in question are not identical, he concluded that at all events *Pambolus biglumis*, Hal., ♂ is not the same species as *Dimeris mira*, Ruthe, ♂ ♀; and this is sufficient so far as the British Fauna is concerned. It may be useful to reproduce Fitch's notes so far as to indicate the resources to be found in the Ruthian collection, whenever anyone may be disposed to attempt a revision of this subfamily.

"I found a most interesting lot of these little apterous or subapterous Bracons :—

Dimeris aptera, Ruthe MS. Seven females taken 3rd March, 22nd—26th September, 28th December, 1854; antennæ 16-jointed.

D. mira, Ruthe. Twelve females and one male taken 30th October, 28th December, 1854, 2nd September, 1855; antennæ ♂ 20-jointed, ♀ 16-jointed.

An *Dimeris* sp.? One male taken 6th June, 1858; base of abdomen yellow, antennæ 18-jointed.

Arrhaphis dubia, Ruthe MS. (an *Dimeris* ♂??). Three males taken 16th September, 1855, 4th June, 1856, 28th July, 1856; antennæ 18—24-jointed.

Dimeris inermis, Ruthe MS. Two males, three females taken 26th October, 1854, 3rd January, 16th September, 1855, 15th August, 1856.

Arrhaphis tricolor, Ruthe. Two males, black, with black 23-jointed antennæ, winged; three females, fulvous, with long tricoloured, 19—20-jointed, antennæ, black in the middle, pale at the apex, apterous; taken 23rd—26th October, 1852, 22nd October, 1856 (♀), 29th June, 1858 (♂). Bred from various species of *Cryptocephalus* (Stett. Zeit., xx., 103; 1859).

A. imminens, Ruthe MS. Two males, black with much shorter antennæ, taken 7th July, 1854, 24th July, 1856.

Terenusa silesiaca, Ratz. (*Bracon silesiacus*, Ratz., Ichn. d. Forst., ii., 30. *Ecphylus silesiacus*, Först., Verh. pr. Rheinl., 1862, p. 237; S. v. Voll., Schets., ii., tab. 6, fig. 11). Var. An n. sp.? One male, antennæ 18-jointed, taken 16th June, 1858; one female.

Terenusa sp.? One small male."

i. DIMERIS, *Ruthe.*

Ruthe, Stett. Zeit., 1854, p. 344; 1855, p. 329.

? *Pambolus*, Hal., Ent. Mag., iv., 49 (1836); S. v. Voll., Schets., ii., tab. 6.

Head globose, antennæ submoniliform, 16—20-jointed, the scape elongate; space between the mandibles and clypeus ample, semicircular; maxillary palpi 5-jointed, 2d joint elongate, 3–5 not so stout, subequal; metathorax bidenticulate; abdomen subbiarticulate, sessile; segment 1 semicircular, divided from the 2d by a deep suture; suturiform articulation effaced; ♂ with 2 cubital areolets;

podiscoidal areolet complete; anal nervure interstitial; ♀ apterous, terebra exserted.

According to Haliday (*lib. cit.*, p. 50) *Pambolus* ♂ has the antennæ 23-jointed, the joints of the flagellum cylindrical; the 3d joint of the maxillary palpi about equal to the two preceding; the scutellum bounded at the base by a double crenate fovea, &c.; and the whole description exhibits discrepancies which forbid the identification of the genus with *Dimeris*.

1. *Dimeris mira*, Ruthe. (Pl. II., fig. 5).

Dimeris mira, Ruthe, Stett. Zeit., 1854, p. 345; 1855, p. 329.
Pambolus melanocephalus, Marsh., E. M. M., vi., 228, ♀.
Paraptesis flavipes, Magretti, Bull. Soc. Ent. Ital., xvi., 1884, p. 101 ♀, tav. ii., f. 2.

Blackish brown, very thickly and finely tuberculated, beset with short adpressed hairs; metathorax bispinose; 1st abdominal segment aciculated; legs, and basal half of the antennæ rufescent; terebra slender, ¼ of the abdomen in length; the latter obtusely rounded at the apex; apterous. ♀. Length, 1—1¼ lines.

Var. Thorax and base of the abdomen rufescent.

I have never seen a ♂, and Ruthe's brief description supplies no more than is given above. The ♀ specimen I possess belongs to the var.; it was given to me some years ago at Cheltenham, but of the circumstances of its capture I have no knowledge. Billups captured four females at Headley Lane on January 28th. One ♀ taken near Florence by Piccioli.

VII. DORYCTIDES.

Head cubical; occiput margined; fore wings with three cubital areolets; abdomen subsessile.

The *Doryctides* are distinguished from the succeeding subfamilies by the cubical head; from the *Braconides* and *Exothecides*, by the margined occiput; from the *Spathiides*, by the subsessile abdomen; and from the *Hecabolides*, by the number of cubital cells. Of the three British genera which Förster's classification here brings together, *Histeromerus* is too abnormal to be mistaken for anything else; *Cœloides* and *Doryctes* considerably resemble *Bracon*.

TABLE OF GENERA.

(2) 1. Antennæ submoniliform, 18—20-jointed, shorter than the head and thorax .. .. iii. HISTEROMERUS.

(1) 2. Antennæ filiform, more than 20-jointed, nearly as long as, or longer than, the body.

(4) 3. Suturiform articulation distinct; præ- and pobrachial areolets of the fore wings of equal length .. .. i. CŒLOIDES.

(3) 4. Suturiform articulation obsolete; præbrachial areolet of the fore wings shorter than the pobrachial .. .. ii. DORYCTES.

i. CŒLOIDES, *Wesm.*

Wesm., Nouv. Mém. Ac. Brux., 1838, p. 59.

Front excavated between the antennæ and ocelli; 3d joint of the antennæ not longer than the 2d; occiput margined. The other characters are those of *Bracon.* The 2d cubital areolet of the fore wing is remote from the exterior margin by much more than its length, measured along the cubitus,—a structure which belongs only to two British species of *Bracon*, *stabilis* and *brevicornis*, Wesm. The species of *Cœloides* are parasites of xylophagous Coleoptera; the two known to be British may be thus distinguished:—

Legs black; abdomen testaceous; recurrent nervure rejected .. .. 1. *scolyticida*, Wesm.

Legs testaceous; abdomen black above; recurrent nervure interstitial .. .. 3. *melanotus*, Wesm.

1. *Cœloides scolyticida*, Wesm. (Pl. II., fig. 6).

Bracon initiator, var. γ., Nees, Mon., i., 102, ♀.
Cœloides initiator, Wesm., Nouv. Mém. Ac. Brux., 1838, p. 60, ♂ ♀, pl., f. 4 (wing). (nec Fab.).
C. scolyticida, Wesm., *lib. cit.*, p. 61.
C. initiatellus, Ratz., Ichn. d. Forst., ii., 39; *cf.* iii., 41.
Cœloides, S. v. Voll., Schets., ii., tab. 5.

Black, smooth and shining; head and abdomen testaceous; palpi, mandibles at the base and apex, stemmaticum, frontal impression, and a large square spot on the face, blackish; prothorax pleuræ, and pectus, somewhat piceous; wings subfuscous with a hyaline stripe beneath the stigma, which is fusco-ferruginous; recurrent nervure rejected; 2d, 3d, and 4th joints of the antennæ short and equal; terebra ♀ about as long as the body. Length, 2½; wings, 5 lines. ♂ ♀.

Antennæ ♀ slender, nearly as long as the body, 37—44-jointed; suture between the pro- and mesothorax sometimes more or less testaceous; mesothoracic sutures obsolete in the middle of the disk, being merged in a punctulate, obscure space before the scutellum; metathorax and abdomen smooth, the latter subcompressed, convex above, as long as the head and thorax; 2d segment short, ½ as long as the 1st, with two lateral impressed lines, curved forwards and uniting to enclose a semicircular space; 3d longest, the rest decreasing in length to the apex; articulations of the legs subferruginous.

The ♂ is similar; antennæ 40—47-jointed, testaceous at the base beneath; the black facial spot often reduced to a narrow line; sometimes there is a black line on the occiput; prothorax more or less testaceous at the sides; fore coxæ and femora, and articulations of the tarsi, more or less testaceous; apical segments of the abdomen often infuscated; wings paler than those of the ♀.

Described from three mutilated specimens, a male and three females, given to me long ago, which agree well with Wesmael's description taken from 16 females and 13 males, except that he considers black to be the predominant colour of the head, while in the British examples testaceous is more prevalent.

Probably this is the species which Curtis (Guide, 2d ed., column 115) referred to *Bracon initiator*, Fab., and of which a pair exists in the Stephensian collection in the British Museum. The true *initiator* is similar, but more than twice as large, with darker wings, and 49—54-jointed antennæ, a parasite of *Rhagium indagator*, Fab., and *Astynomus ædilis*, Lin. If British, it is most likely to be found in Scotland.

C. scolyticida is a parasite of *Scolytus destructor*, Ol., and has been reared abundantly by Radzay and Wissmann, according to Ratzeburg. See Wesm., Bull. Ac. Brux., 1838, p. 220, and Guérin-Méneville, Bull. S. E. F., 1846, p. lxxviii., on the services rendered by this insect in keeping down the numbers of the *Scolytus*, and Giraud (Bull. S. E. F., 1872, p. x.) on the probable parasitism of this or an allied species on *Bostrychus typographus*, L. The "*B. initiator*," bred by Perris from *Pissodes notatus*, Fab., is doubtless referable to this species.

2. *Cœloides melanotus*, Wesm.

Cœloides melanotus, Wesm., Nouv. Mém. Ac. Brux., 1838, p. 61, ♂ ♀; Ratz., Ichn. d. Forst., iii., 40, ♂.

Testaceous, smooth and shining; antennæ black, except at the base; head, thorax, and abdomen black above; wings subfuscous, paler towards the tips; recurrent nervure interstitial; 4th joint of the antennæ as long as the 2d and 3d together; terebra ♀ as long as the body. Length, 1½–2; wings, 3—4 lin. ♂ ♀.

Antennæ ♂ ♀ about 26—27-jointed (Ratzeburg says 29 in ♂), scarcely as long as the body. Mesothoracic sutures uniting in an impunctate space before the scutellum. The rest of the structure resembles that of the preceding species. In the ♂ the apex of the abdomen is wholly testaceous, and the black colour of the upper surface less intense than in the ♀; in one specimen the 2d segment is entirely piceous.

Described from five males and three females in good preservation. One pair was taken on an old railing in Shropshire, the others are from South Wales; I believe Chapman bred them from some xylophagous coleopteron, probably *Hylosinus* (see E. M. M., v., 120). Cartereau found them parasitic on *Hylosinus fraxini*, Fab., and Nördlinger bred a ♂ on July 3rd.

ii. DORYCTES, *Hal.*

Hal., Ent. Mag., iv., 43; Reinh., Berl. ent. Zeit., 1865, p. 246.

Suturiform articulation obsolete or subobsolete; terebra exserted; recurrent nervure interstitial or rejected; anal nervure not interstitial; præbrachial areolet shorter than the pobrachial; pobrachial areolet of the hind wings longer than ½ the præbrachial; hind wings ♂ without a stigma; hind coxæ angularly produced in front.

The insects of this genus have an elongate appearance, which is due to the production of the head behind the eyes, and the attenuation of the thorax in front and behind. Mesothoracic sutures rugulose, ending posteriorly in a shallow fovea before the scutellum; middle lobe of the mesothorax more or less canaliculated; metathorax elongate, obscurely divided into five compartments, two larger in front, and three behind, whereof the medial one penetrates to some distance between the anterior. Abdomen of the ♀ obovate, convex; of the ♂ narrower, elongate, and depressed.

In the Ent. Mag., iv., 46, Haliday's Subgenus III. *Heterospilus* has been a source of error and perplexity. It was misplaced by the printer, and appears to belong to Spp. 4, 5, 6, whereas it refers only to the footnote on p. 47 (*cf.* p. 106, note), its type being the exotic Sp. 6b *H. quæstor*, the ♂ of which has a stigma in the hind wings. The name *Heterospilus* must therefore be eliminated from every work on European insects where it occurs, and *Doryctes* substituted instead, according to the author's intention. At the same page 46, for Sp. 4. *H. D. striatellus*, and Sp. 5. *H. D. Imperator*, read *R. D. striatellus*, and *R. D. Imperator*. In Förster's Synopsis (Verh. pr. Rheinl., 1862, p. 239) all that relates to *Heterospilus*, " ♂ *H. Flügel* mit einem Randmal," &c., must be struck out.

Reinhard has described 13 species of *Doryctes*, parasites of the *Cerambycidæ*, *Buprestidæ*, *Anobiidæ*, and *Curculionidæ*. The four British species are very rare.

(2) 1. Second abdominal segment smooth .. 1. *imperator*, Hal.
(1) 2, Second abdominal segment striolated.
(4) 3. Abdomen (except the first segment) bright testaceous .. .. 2. *Heydenii*, Reinh.
(3) 4. Abdomen fuscous or piceous.
(6) 5. Vertex and thorax granulated, obscure, with fulvous pubescence .. .. 3. *spathiiformis*, Ratz.
(5) 6. Vertex and thorax mostly shining, with very few hairs .. .. 4. *striatellus*, Nees.

1. *Doryctes imperator*, Hal.

Doryctes imperator, Hal., Ent., Mag., iv., 46, ♀.
Ischiogonus zonatus, Wesm., Nouv. Mém. Ac. Brux., 1838, p. 127, ♀.
Bracon præcisus, Ratz., Ichn. d. Forst., iii., 36, ♀.
Doryctes imperator, Reinh., Berl. ent. Zeit., 1865, p. 247, ♂ ♀.

Pitchy-black; antennæ at the base, mouth, and legs, rufo-testaceous; tibiæ at the base, and palpi, pale; 2d abdominal segment of the ♀ piceo-rufous; wings subhyaline; vertex smooth and shining: sides of the mesothorax smooth, with an elongate crenate impression; 1st abdominal segment striolated, the rest smooth; terebra ♀ as long as, or longer than, the body. ♂ ♀. Length, $2\frac{1}{4}$—$3\frac{1}{2}$ lines; wings, $4\frac{1}{2}$—$6\frac{2}{3}$ lin.

Var. 1, ♀. Abdomen entirely rufous or rufo-testaceous.

Var. 2, ♀. Head and abdomen piceo-rufous.

Var. 3, ♀. Piceo-testaceous, the head piceo-rufous.

Head rugulose in front, vertex convex, smooth, and shining; antennæ as long as the body, in one ♀ 29-jointed; mesothorax finely granulated, with rugulose sutures, somewhat shining; metathorax elongate, with five areæ, the two anterior granulated, almost obscure, the medial area narrow, rectangularly produced in front, the posterior areæ more rugulose; abdomen ♂ narrow, lanceolate; of the ♀, elongate; 1st segment ♂ half as long again as its apical width, of the ♀ somewhat longer, subattenuated towards the base, elevated in the middle, depressed at the sides, longitudinally striolated, or in the middle almost smooth, the following segments entirely so; wings nearly hyaline, radius originating somewhat behind the middle of the fuscous stigma. The colours of the ♀ are variable, but the varieties above indicated are much rarer than the typical form.

Very rare in England, but formerly taken by Curtis, and a ♀ by me in a hedge near Abergavenny. Wesmael had only a single example from Liége. Reinhard's description is from 7 males and 21 females collected in different parts of Germany. Parasitic on the Continent on *Buprestis Berolinensis*, Fab., and *Astynomus ædilis*, L. Brischke saw six issue, on May 23rd, from a hole in timber made by *Astynomus*. This longicorn is not yet extinct in Scotland, and the *Doryctes* may be expected to occur in the Black Wood of Rannoch.

2. *Doryctes Heydenii*, Reinh. (Pl. II., fig. 7).

Doryctes Heydenii, Reinh., Berl. ent. Zeit., 1865, p. 253, ♀.

Elongate, black; mouth piceous; palpi and base of tibiæ pale; abdomen (except the 1st segment) bright rufo-testaceous: vertex, and sides of the mesothorax, smooth, shining, the latter with a rounded smooth foveola continued forwards by a narrow channel; abdominal segments 1, 2, and base of 3, rimulose; suturiform articulation subobsolete; wings hyaline: terebra ♀ as long as the abdomen. Length, $2\frac{1}{4}$; wings, $4\frac{1}{2}$ lines. ♀. Male not known.

Antennæ black, slender, 40-jointed, as long as the body with the terebra; mesothorax granulated in the middle of the disk, the three lobes more shining, punctulate; scutellum and metathorax granulated, obscure; the latter areated, the intermediate area projecting angularly between the two dorsal, which are partly smooth at the base; abdomen oblong-ovate, somewhat longer but not wider than the thorax, compressed, flattened above; segment 1 longer than its apical width, hardly attenuated at the base; the 4th and following segments have each a faint transverse impression in the middle; 2d joint of the trochanters testaceous: stigma and nervures brown, recurrent nervure interstitial. The abdomen of the living insect is of a bright orange colour, except the 1st segment. Valves of the terebra pilose, black.

I obtained this rare and conspicuous species by beating an old whitethorn hedge, in July, near the village of Anstey, Leicestershire. Reinhard's three specimens were from Prussia, Hungary, and Italy.

3. *Doryctes spathiiformis*, Ratz.

Doryctes obliteratus, Hal., Ent. Mag., iv., 44, ♂ (nec Nees, Wesm., Ratz.).

Bracon spathiiformis, Ratz., Ichn. d. Forst., ii., 37, ♂ ♀.

Doryctes spathiiformis, Reinh., Berl. ent. Zeit., 1865, p. 257, ♂ ♀.

Rufo-piceous; spots on the mesothorax, metathorax, coxæ, and femora, fuscous; trochanters and tibiæ pallid, the latter broadly annulated with fuscous in the middle; wings subhyaline, the three cubital areolets clouded in the middle with fuscous; head and thorax clothed with short, fulvous, adpressed pubescence; head granulated, scarcely shining; sides of the mesothorax smooth, with a crenate impression; abdominal segments 1, 2, and base of 3, very finely and closely aciculated, suturiform articulation usually discernible, but very fine; terebra ♀ as long as the body. ♂ ♀. Length, $\frac{3}{4}$—$2\frac{1}{4}$ lines; wings, $1\frac{1}{3}$—4 lin.

Antennæ somewhat longer than the body, of the ♀ 32-, of the ♂ 36-jointed; mesothorax and scutellum dull, granulated; metathorax the same, but more shining at the base, areation distinct, the intermediate area small and narrow; 1st abdominal segment gradually attenuated to the base, where it is only half as wide as at the apex, in the ♂ about twice as long, in the ♀ $1\frac{1}{2}$ as long, as its apical width, finely aciculated throughout; suturiform aciculation marked by a fine line, visible at least in places; 2d segment and basal half of the 3d very finely aciculated longitudinally; the following segments smooth, each having in the middle a brown transverse band; recurrent nervure rejected; præ- and pobrachial areolets nearly of equal length.

I have translated Reinhard's description, having before me only a specimen of Walker's in bad condition. Rare in England, but taken also formerly by Curtis. In Sichel's collection are six specimens from Brétagne. Bred by Nördlinger at Pont Château near Grand Jouan (also in Brétagne) from hazel-sticks containing the larvæ of *Anobium striatum*, Ol. Some of the Braconids emerged in winter, and others in the following summer.

4. *Doryctes striatellus*, Nees.

Bracon striatellus, Nees, Mon., i., 107, ♀.
Doryctes striatellus, Hal., Ent. Mag., iv., 46, ♀.
D. tabidus, Hal., *lib. cit.*, 47, ♂.
Ischiogonus obliteratus, Wesm., Nouv. Mém. Ac. Brux., 1838, p. 126, ♂ ♀, pl., fig. 15 (wing). (nec Nees, Hal., Ratz.).
Doryctes striatellus, Reinh., Berl. ent. Zeit., 1865, p. 256, ♂ ♀.

Shorter and stouter than the two preceding. Black; palpi pale, mandibles and legs ferruginous, tibiæ at the base obsoletely whitish; head very slightly narrowed behind the eyes, vertex smooth; sides of the mesothorax smooth, with a round foveola, continued forwards by a linear impression; 1st abdominal segment, and most of the 2d, rimulose; prothorax beneath, and segments 1—3, more or less piceous or rufous; wings hyaline, stigma and nervures fuscous; terebra ♀ as long as the abdomen. Length, ♂ 1¼—1½; ♀ 2½; wings, 4¾ lines.

Var. 1, ♀. Thorax and abdomen entirely black,

Var. 2, ♀. Pro- and metathorax rufous; abdominal segments 1—2 rufo-testaceous.

Head smooth and shining; antennæ ♀ 33—40-jointed, as long as the body, black, the first two joints piceous; mesothoracic sutures rugulose, converging in a rugulose obscure space before the scutellum; metathorax rugulose, very distinctly areated in one specimen, the two dorsal areæ oblong, rounded at the apex, smooth at the base; abdomen oblong-lanceolate, flattened above; segment 1 hardly narrower at the base, a little longer than its apical width, with two inchoate basal carinæ; suturiform articulation invisible, or only slightly apparent at the sides; legs stout, fore tarsi nearly twice as long as their tibiæ; recurrent nervure rejected; 2d intercubital nervure decolorous.

Antennæ ♂ 33—42-jointed, longer than the body; abdomen wholly piceous-black; four posterior femora with a black line above; tibiæ at the base less distinctly pallid. In the Ent. Mag., iv., 47, the number of joints in the antennæ is printed 29, which is probably a misprint for 39. Bridgman's specimen has the antennæ 33-jointed, which agrees with Wesmael's description.

Parasitism not known. Haliday says he had seen one ♀; and his ♂ (*tabidus*) was taken near London by Walker. The ♂ has been found recently near Norwich by Bridgman; the ♀ in a house at Worcester by Fletcher, and another by me at Lastingham, Yorkshire. Bonelli sent specimens of the ♀ to Nees from Italy. Wesmael was acquainted with 26 of both sexes, taken on windows and on the fence of a botanic garden. Reinhard examined only a single pair from Von Heyden's collection, and doubts their distinctness from *D. obliteratus*, Nees, in which the legs are piceous, &c.

iii. HISTEROMERUS, *Wesm.*

Wesm., Nouv. Mém. Ac. Brux., 1838, p. 63.

Head depressed, elongate behind the eyes, which are small; oral aperture large, transverse; maxillary palpi 6-, labial 4-jointed; antennæ ♂ ♀ submoniliform, shorter than the head and thorax; abdomen sessile; suturiform articulation obsolete; four anterior legs very short, with clavate tibiæ, shorter than the tarsi; hind tibiæ and tarsi of equal length, the metatarsus longer than the other joints together, curved, incrassated at the base and gradually diminishing to the apex, where it is again slightly enlarged; three cubital areolets in the fore wings; 2d intercubital nervure subobsolete; transverse nervure evected; præ- and pobrachial areolets of equal length; anal nervure not interstitial; pobrachial nervure sinuated not far from its origin; radial areolet narrow, elongate; nervures of the hind wings as well defined as those of the fore; radius, cubitus, and præbrachial transverse complete; pobrachial areolet not half the length of the præbrachial.

1. *Histeromerus mystacinus*, Wesm. (Pl. III., fig. 1).

Histeromerus mystacinus, Wesm., Nouv. Mém. Ac. Brux., 1838, p. 65, ♀; pl., f. 5 (wing); ff. A—E (details); S. v. Voll., Schets., ii., tab. 5 (wing).

Piceous, smooth; head and thorax black; antennæ fuscous, testaceous at the base; legs, stigma, nervures, and valves of the terebra, piceo-testaceous; terebra less than ½ the abdomen. ♂ ♀. Length, ♂ 1; wings, 2½ : ♀ 1¾; wings, 3½ lines.

Antennæ ♂ ♀ about 1½ times as long as the head, 17—20-jointed, the joints discrete, equal, subquadrate, except the last, which is ovate, acuminate. The shape of the head suggests that of *Bethylus* or *Epyris*. Palpi and mandibles pale, the former beset with long hairs; prothorax piceous; 1st abdominal segment rectangular, somewhat longer than its width, with two curved lateral impressions enclosing a smooth space; terebra rufous, the valves piceous, darker at the apex. The ♂ corresponds in all respects, but is much smaller; the thorax is piceous instead of black.

The ♀ here described exhibits a singular irregularity in the neuration. The left fore wing is furnished with an extra recurrent nervure, connecting the middle of the 2d cubital areolet with the anal nervure, and forming a pentagonal areolet equal in size to the prædiscoidal.

This curious insect, of unknown habits, has not hitherto been noticed as British. The pair I possess was given to me by Ward, who had several which he wished to get named. They were taken, I believe, in or about London. Wesmael possessed two females taken probably near Brussels.

VIII. HORMIIDES.

Head transverse, occiput margined; antennæ submoniliform; abdomen consisting of more than two visible segments, sessile or subsessile; suturiform articulation superficial or effaced; terebra exserted; three cubital areolets; anal nervure interstitial.

Distinguished from the *Pambolides* by the number of cubital areolets, and of sutures in the abdomen. The anal nervure is in the same straight line as the præbrachial, a character rarely found among the Braconids, and belonging to no other group of Cyclostomi except this and the *Pambolides.* Förster has separated the two genera by the difference of the suturiform articulation, which is difficult to seize, and of only secondary value. On page 240 of his Synopsis (Verh. pr. Rheinl., 1862) an error must be corrected. For "Erstes und zweites Segment," read "Zweites und drittes"; and for "Erstes Segment von dem zweiten," read "Zweites Segment von dem dritten."

The genera may be thus distinguished:—

Præbrachial areolet shorter than the pobrachial; antennæ ♂ 11-, ♀ 12-jointed	i. CHREMYLUS.
Præ- and pobrachial areolets of equal length; antennæ ♂ ♀ more than 12-jointed	ii. HORMIUS.

i. CHREMYLUS, *Hal.*

Hal., Ent. Mag., i., 266; iv., 50; *Penecerus*, Wesm., Nouv. Mém. Ac. Brux., 1838, p. 70.

Antennæ submoniliform, as long as the head and thorax, 11—12-jointed; abdomen wider than the thorax, depressed, ovate; segment 1 constituting one-fifth of the whole, semicircular, transverse, with two acute longitudinal carinæ; suturiform articulation effaced, the compound segment thus formed equalling by itself ½ of the abdomen; the remaining segments short, partially retracted beneath the 2d, but not invisible as in the *Pambolides*; radius originating in the middle of the stigma; 2d cubital areolet trapeziform, shorter and less produced inwardly than in *Hormius*; recurrent nervure interstitial; pobrachial areolet of the hind wings less than ½ the length of the præbrachial.

1. *Chremylus rubiginosus*, Nees. (Pl. III., fig. 2).

Hormius rubiginosus, Nees, Mon., i., 156, ♀.
Chremylus rubiginosus, Hal., Ent. Mag., iv., 51, ♀; Cur., Farm Ins., 365, ♂ ♀; S. v. Voll., Schets., ii., tab. 6, ♀.
Penecerus rubiginosus, Wesm., Nouv. Mém. Ac. Brux., 1838, p. 70, ♀, pl., f. 7 (wing).

Castaneous; head, antennæ at the apex, thorax and base of abdomen more or less, and stigma, fuscous; palpi pale; terebra ⅓—⅔ of the abdomen. ♂. Length, ½; wings, ¾ line: ♀, length 1; wings, 2 lines.

♀. Granulated, obscure; scutellum and apical half of the abdomen more shining; metathorax rugulose, truncate, and bidenticulated at the hind angles, but less acutely than in *Dimeris*, more or less distinctly divided into five areæ, the two dorsal large, rounded behind, the medial projecting angularly between them; 1st abdominal segment and base of the 2d punctulate, the former semiorbicular, as in *Dimeris*, with two acute parallel carinæ.

The ♂ (which I have not seen) is similar, according to Curtis, but only ¼ as large, and is remarkable for having one joint less in the antennæ than the ♀, the ordinary sexual distinction being reversed: *cf.* Hal., Ent. Mag., i., 266, where he appears to have established the genus upon a ♂ specimen, although in iv., 50, only the ♀ is described. The same writer says that the metathorax is "haud areatus"; probably he had before him a ♀ in which this structure was not conspicuous, as in my specimens, and in the six described by Wesmael.

Widely distributed, and often found in windows of old houses: I have four females taken in such a situation in Northamptonshire. According to Curtis (*l. c.*) it is a frequent parasite of *Bruchus rufimanus*, Boh.; his specimens were bred on April 24th from beans grown in Essex; Rondani bred it from *Bruchus seminarius*, L.;

and Taschenberg says it is a parasite of *B. granarius*, Sch. Fitch reared a ♀ on Sept. 8th from wheat-refuse infested with weevils (*Calandra*); and Billups another on May 23rd. Brischke has bred it from the cases of *Tinea pellionella*, L.

ii. HORMIUS, *Nees.*

Nees, Act. Ac. L. C. 1818, p. 305; Mon., i., 152; Hal., Ent. Mag., iv., 52.

Antennæ much longer than the head and thorax, more than 12-jointed; abdomen more oblong than in *Chremylus*; segment 1 formed as in *Bracon*, with an oblong medial scutum and membranaceous margins; suturiform articulation superficial; segment 2 twice as long as 3, with two longitudinal impressions near the sides, arcuate, and approximating towards the base; hind margins of the segments somewhat elevated; segments 4—6 equal, 7—8 minute; radius originating beyond the middle of the stigma; 2d cubital areolet with its inner hinder angle much produced, this angle receives the evected recurrent nervure; pobrachial areolet of the hind wings as in *Chremylus*.

1. *Hormius moniliatus*, Nees. (Pl. III., fig. 3).

Hormius moniliatus, Nees, Mon., i., 153, ♀; Hal., Ent. Mag., iv., 52, ♂ ♀; Wesm., Nouv. Mém. Ac. Brux., 1838, p. 67, pl., f. 6 (wing), ♀; S. v. Voll., Schets., ii., tab. 5.

H. piciventris, Wesm., *lib. cit.*, p. 68, ♂ ♀.

Metathorax and scutum of the 1st abdominal segment black, the rest of the body variable in colour, black, red, or testaceous; antennæ ♂ longer, of the ♀ rather shorter, than the body; wings yellowish hyaline, often with an indeterminate dusky medial stripe from the base to the apex; stigma generally yellow; terebra ♀ exserted, short. Length, 1—1⅓; wings, 2—2¾ lines.

Variable in colour, in the length, and number of joints, of the antennæ, and in the rugosity of the 1st segment, which is graduated in different specimens until finally it appears almost smooth. I am unable to find any real difference between Wesmael's *piciventris* and the radical species, and they are here united, in accordance with the opinion of Haliday. The abdomen in British examples is testaceous, more or less pitchy, and with the lateral margins darker; the legs are testaceous, with more or less infuscated femora, the tips of the tarsi hardly darker.

Var. 1. Head, thorax, and antennæ, black ♀; antennæ ♂ testaceous at the base.

Var. 2. Head and thorax ferruginous varied with black; antennæ fuscous.

Var. 3. Head and thorax ferruginous; antennæ testaceous, darker at the base and apex.

Var. 4. Stigma fuscous.

Antennæ ♀ 17—22-jointed; thorax smooth, shining; mesothoracic sutures meeting in a rugulose depression; at the base of the scutellum is a bipartite rugulose foveola; metathorax reticulato-rugulose, with or without two carinæ indicating the medial area between the two dorsal; abdomen regularly ovate, depressed, pellucid (the ova, according to Nees, being visible in life, strung into a series posteriorly towards the oviduct); segment 1 transverse, the membranaceous edges depressed, scutum oblong, rectangular, more or less rugulose, or even smooth; terebra one-fourth or one-sixth the length of the abdomen. The ♂ is much smaller, with 24—25-jointed antennæ.

Abundant at the roots of rushes on the sand-hills at Freshwater Bay, Pembrokeshire; most of these belong to the dark varieties (*piciventris*, Wesm.). Found in moss at the roots of trees, or shaken out of furze and dead leaves in spring; St. Albans, Maldon, Worcester, Headley Lane, &c. Bred by Brischke from *Tortrix corylana*, Fab. Cocoons thin, white, cylindrical, attached together by threads of silk.

IX. RHOGADIDES.

Head transverse, occiput margined; mandibles bifid; maxillary palpi 6-, labial 4-jointed; abdomen sessile, segments 1—3 largest, sculptured, thyridia of the 2d and 3d visible; three cubital areolets, the 2d rectangular (in *Clinocentrus* and *Pelecystoma*, trapezoidal); recurrent nervure rejected; pobrachial areolet longer than the præbrachial; anal nervure not interstitial; terebra subexserted (in *Clinocentrus* and *Pelecystoma*, exserted).

The insects of this very natural division are of large or moderate size, and robust structure, with elongate antennæ and abdomen; their integuments are hard, and more or less covered with rugulosities or punctures; their colours are black, testaceous, and rufous, the last appearing chiefly in bands upon the abdomen, or alternating with black upon the head and thorax of the typical Rhogades. They are parasites of lepidopterous larvæ.

The genus *Rhogas*, Nees, was divided by him into three sections (Act. Ac. L. C., 1818, p. 306), comprising very dissimilar insects. The first and third sections have the clypeus contiguous to the mandibles, the former being co-extensive with the *Macrocentrides*, and the latter (*Ademon*, Hal.) agreeing better with the *Opiides*, according to the views of Wesmael and Reinhard; but it was placed by Haliday between *Rhogas* and *Clinocentrus*. The second section, "Species genuinæ" of Nees, has been subdivided into five genera, all of which are British, and may be synoptically represented as follows:—

(4) 1. Suturiform articulation obsolete.
(3) 2. Second cubital areolet rectangular; abdomen longer than the head and thorax, of the ♀ strongly compressed from the 2d segment; terebra subexserted .. .. ii. Petalodes.
(2) 3. Second cubital areolet trapeziform; abdomen not longer than the head and thorax, of the ♀ only subcompressed at the apex; terebra considerably exserted .. .. .. i. Clinocentrus.
(1) 4. Suturiform articulation distinct, crenulate.
(6) 5. Third joint of the maxillary palpi dilated internally, securiform; terebra exserted .. iii. Pelecystoma.
(5) 6. Third joint of the maxillary palpi simple; terebra subexserted.
(8) 7. First abscissa of the radius longer than the second; in the ♀, segments 4 and following retracted and concealed beneath the 3d .. iv. Heterogamus.
(7) 8. First abscissa of the radius shorter than the second; in the ♀, segments 4 and following not retracted and concealed beneath the 3d v. Rhogas.

i. Clinocentrus, *Hal.*

Hal., Ent. Mag., i., 266 (1833); iv., 94.

Abdomen ♀ oblong-ovate, not longer than the head and thorax, convex above and subcompressed at the apex, segments 1—3 subequal, occupying about $\frac{7}{8}$ of the total length, the rest being very short; spiracles of the 1st segment medial; suturiform articulation obsolete; sides of the mesothorax impressed with a deep furrow; 1st cubital areolet hexagonal, one of its shortest sides, the lower, always decolorous, the rejected transverse nervure falls exactly on the inner end of this side; 2d cubital areolet trapeziform; terebra $\frac{1}{3}$—$\frac{3}{4}$ the length of the abdomen. Abdomen ♂ more linear, depressed, segments 1—3 occupying about $\frac{2}{3}$ of its length.

This genus is intermediate between the *Exothecides* and the true *Rhogadides*, showing affinity to the former in the exsertion of the terebra, the obsolete suturiform articulation, and the trapezoidal shape of the 2d cubital areolet. Wesmael described three species, forming the last section of his *Exothecus*, all of which appear to be British, and, with the exception of *exsertor*, Nees, identical with those established by Haliday.

(2) 1. Hind femora tipped with black .. .. 3. *exsertor*, Nees.
(1) 2. Hind femora entirely testaceous.
(4) 3. Stigma testaceous, darker at the outer angle 4. *cunctator*, Hal.
(3) 4. Stigma fuscous, the inner angle testaceous; in one case wholly fuscous.
(6) 5. Segment 3 dull, minutely aciculated .. 1. *excubitor*, Hal.
(5) 6. Segment 3 shining, smooth, or nearly so.
(8) 7. Stigma ♂ fuscous, unicolorous; terebra ♀ as long as ½ abdomen .. .. .. 5. *vestigator*, Hal.
(7) 8. Stigma ♂ bicolorous; terebra ♀ as long as ⅓ abdomen .. .. 2. *umbratilis*, Hal.

1. *Clinocentrus excubitor*, Hal.

Clinocentrus excubitor, Hal., Ent. Mag., iv., 94, ♂ ♀; (?) S. v. Voll., Schets., ii., tab. 5.
Exothecus marginellus, Wesm., Nouv. Mém. Ac. Brux., 1838, p. 86, ♀.

Black; mouth, orbits, mesothorax beneath, legs, and a line before the wings, testaceous; abdominal segments 1—3 longitudinally rugulose; segment 1 obconic; stigma bicolorous; terebra ♀ ⅔ as long as the abdomen. Length, 2—2⅔; wings, 4½—5½ lines.

Clypeus testaceous, palpi paler; antennæ as long as the body, 33—36-jointed (35- in my specimen), black, joint 1 beneath, and 2 at the apex, testaceous; metathorax not areated, rugose; abdomen hardly longer than the thorax, obovate, segments 1—2 longitudinally rugulose, with punctulate interstices, 3 more finely sculptured, nearly smooth at the apical angles, the hind margin narrowly testaceous; the other segments smooth, almost entirely retracted beneath the 3d, with similar pale margins; segment 1 almost twice as wide at the apex as at the base, shorter than twic its apical width, with a medial carina which is bifurcate at the base; wings hyaline, stigma fuscous, its inner half testaceous, ♀. The ♂ has the suturiform articulation more completely effaced, the abdomen narrower, and sometimes a rufescent patch on the mesothorax.

Taken by Haliday in woods, England and Ireland; by me near Barnstaple. Wesmael found a ♀ at Charleroi.

According to Van Vollenhoven, four males and five females were bred from the pupæ of *Noctua ditrapezium*, Bork.

2. *Clinocentrus umbratilis*, Hal.

Clinocentrus umbratilis, Hal., Ent. Mag., iv., 95, ♀.

Black; face, orbits, sometimes the base of the antennæ, prothorax, pectus, disk of the mesothorax more or less, legs with their coxæ, and 3d abdominal segment more or less, testaceous; stemmaticum and claws black. Wings hyaline, stigma bicolorous. Segments 1—2 rimulose, faintly carinated in the middle, 1 almost linear, 3 and following smooth, 3 slightly punctulate in the ♀. Terebra as long as ½ the abdomen. ♂ ♀. Length, 2¾; wings, 5 lines.

Like *excubitor* in sculpture, but the abdomen is longer and narrower: segment 1 hardly attenuated at the base, more than twice as long as its apical width; 1—2 striolated, 3 vaguely punctulate in the ♀, the punctures disposed in minute irregular striolæ, which towards the sides divaricate transversely; extreme lateral margins rufescent; in the ♂ the 3d segment is smooth, and nearly all testaceous, except the fore and hind margins. Abdomen somewhat nigro-fuscous; belly testaceous. Antennæ ♂ 30-jointed. Scutellum (in one specimen) testaceous.

The ♀, which I have not seen, was taken by Haliday with *excubitor* and *cunctator*. I found one ♂ at Govilon, near Abergavenny, and another in the New Forest, in May.

3. *Clinocentrus exsertor*, Nees. (Pl. III., fig. 4).

Rogas exsertor, Nees, Mon., i., 207, ♀.
Exothecus exsertor, Wesm., Nouv. Mém. Ac. Brux., 1838, p. 87, ♂ ♀, pl., fig. 10 (wing).
Bracon orbitator, Nees, Mon., i., 91, ♀.

Black; mouth, orbits, mesothorax before the scutellum, 3d abdominal segment, and legs, rufo-testaceous; hind femora (sometimes also the intermediate pair) black at the apex; segments 1—2 and part of 3, rugulose; stigma bicolorous; terebra nearly as long as the abdomen. ♂ ♀. Length, 1½—2; wings, 3¾—4¼ lines.

Variable in the extent of the testaceous markings; orbits and metathorax often wholly black; 3d abdominal segment rufo-testaceous only at the sides, or the abdomen is entirely black; the intermediate femora not always black at the apex.

Antennæ ♀ as long as the body, 31—36-jointed (34- in my specimen), joints 1—2 sometimes testaceous at the base; metathorax rugulose, the medial area more or less distinct; 1st abdominal segment with a medial carina bifurcate at the base, longitudinally striolate, like the 2d; segment 3 more or less testaceous, more finely striolate, posteriorly smooth, the striolæ have a tendency to divaricate from the medial line and become transverse; the remaining segments smooth, extreme apex of the abdomen rufescent; the hind femora at least are always tipped with black, by which the species may be known. The ♂ has also 34-jointed antennæ in my specimens, longer than the body; the rugulosity of the 3d segment is more pronounced, and straight; in one example the hind coxæ are infuscated.

Neither *umbratilis* nor *vestigator*, Hal., can be this species, as their hind femora are concolorous, a reason which Haliday himself gives (Ent. Mag., iv., 96) for not uniting *umbratilis* and *exsertor*.

Not uncommon near St. Albans; I have five males and one female from that neighbourhood, and a ♀ taken in Darenth Wood. Elisha bred a dark ♂ from *Hedya neglectana*, Dup., on July 31st.

4. *Clinocentrus cunctator*, Hal.

Clinocentrus cunctator, Hal., Ent. Mag., iv., 95, ♂ ♀.
Exothecus analis, Wesm., Nouv. Mém. Ac. Brux., 1838, p. 85, ♂ ♀.

Black; mouth, orbits, markings of the thorax in front, abdomen at the apex, and legs, testaceous; abdomen striolate at the base, segment 1 obconic; terebra ⅔ the length of the abdomen. ♀. Length, 1½—2; wings, 3—4½ lines.

Like *excubitor*, Hal., differing principally in the sculpture of the abdomen; segments 1—2 somewhat shining, finely striolated, the interstices impunctate; the other segments dull testaceous, or infuscated, 3d minutely aciculated transversely, the following almost smooth; belly pale testaceous; head testaceous, face beneath the antennæ, middle of the vertex, and rim of the occiput, fuscous; thorax in front, at the sides, and beneath, testaceous, on the disk are three confluent fuscous patches; metathorax black, punctato-reticulate, without areæ; legs pale testaceous; wings hyaline, stigma pale testaceous, fuscous at the apex. The ♂ differs in having the posterior abdominal segments less abbreviated and more broadly smooth; the exterior nervures of the wings are sometimes incrassated; antennæ (in one specimen) 28-jointed.

Antennæ ♀ 30-jointed, as long as the body, blackish above, ferruginous beneath, joints 1—2 testaceous; prothorax testaceous beneath; mesothorax with two longitudinal testaceous lines dilated behind and uniting near the middle of the disk, curved outwards in front and bordering the prothorax to the insertion of the wings; 3d abdominal segment testaceous, blackish at the sides and apex; the remaining segments, and belly, testaceous; terebra nearly as long as the abdomen. In the ♂ described by Wesmael the testaceous dorsal lines of the mesothorax were indistinct, and segments 4—5 blackish.

Not common; Haliday took his specimens in woods in the West of Ireland; I found a ♂ near Abergavenny in May; and Wesmael possessed a male and two females captured near Brussels.

5. *Clinocentrus vestigator*, Hal.

Clinocentrus vestigator, Hal., Ent. Mag., iv., 95, ♂ ♀.

Black; antennæ at the base, mouth, orbits, and legs, testaceous; abdomen rugulose at the base; stigma of the ♂ entirely fuscous; terebra ♀ ⅓ the length of the abdomen. Length, 1½—2; wings, 3—4 lines.

Shorter than the preceding species, metathorax more coarsely rugose; antennæ 27-jointed; abdomen shorter, ovate, segments 1—2, and sometimes 3 at the base, rugulose, the rest smooth, nigro-piceous; terebra less than half as long as in the other species, stouter, subclavate; wings hyaline, stigma somewhat larger, fuscous, pale at the base, in the ♂ wholly nigro-fuscous, or with a small testaceous basal streak.

Var. 1. Third abdominal segment testaceous at the sides, fuscous in the middle.

Var. 2, ♂. Apex of the scutellum fuscous.

Var. 3, ♂. More finely sculptured; head black, face pale testaceous.

Inhabits England and Ireland. Not common. I have a ♂ of this species, taken at Nunton, near Salisbury.

ii. PETALODES, *Wesm.*

Wesm., Nouv. Mém. Ac. Brux., 1838, p. 123; Reinh., Berl. ent. Zeit., 1865, p. 245.

Suturiform articulation obsolete; 2d cubital areolet rectangular; abdomen sublinear, of the ♂ depressed, of the ♀ strongly compressed from segment 2 to the apex, longer than the head and thorax; terebra subexserted.

1. *Petalodes unicolor*, Wesm. (Pl. III., fig. 5).

Petalodes unicolor, Wesm., *l. c.*, ♀, pl., fig. 14 (wing); Reinh., *l. c.*, ♂ ♀; S. v. Voll., Pinac., pl. iv., f. 2 (with details of ♀ abdomen and antenna).
Rogas compressor, Schäff., F. G., 156.

Testaceous; stemmaticum, a patch on the metathorax, and the antennæ towards the apex, fuscous; valves of the terebra and tips of the tarsi black; wings subhyaline, stigma yellow, nervures pale fuscous. ♂ ♀. Length, 2¼—3; wings ♀, 4½ lines.

Antennæ ♀ 32-jointed, in two specimens (36-jointed in the one described by Wesmael), much shorter than the body; front with a geminated fovea above the antennæ; thorax compressed; mesothorax flat on the disk, truncated in front of the ante-scutellar crenate fovea, the sutures subobsolete; head and thorax granulated, not shining; a smooth space on each side of the scutellum; metathorax carinated, villose; abdomen ½ longer than the head and thorax, segment 1 rectangular, 2½ times as long as its width, striolated, with narrow, raised, smooth margins, finely carinated from the base to beyond the middle; segment 2 equal and similar, except that here begins the lateral compression of the abdomen; 3 shorter, narrower, more compressed, striolated at the base, smooth at the apex, as are the following segments, which present a subcultriform edge above, and successively diminish in length; suturiform articulation nearly effaced; belly similarly compressed; valves of the terebra flattened, punctulate, scarcely surpassing the anus. Antennæ ♂ as long as the body, 42-jointed; abdomen somewhat longer than the head and thorax, parallel at the sides to the end of segment 4, depressed, thence to the apex more convex, and narrower.

The ♀ is easily distinguished by the elongate compressed abdomen; the ♂ resembles some of the pale species of *Rhogas*, but may be known by the obsolete suturiform articulation, and the shape of the abdomen, the sides of which are parallel near the base.

This species has the same habits as *Rhogas*, attacking young larvæ, and undergoing its transformations inside their dried bodies. A dozen or more males and females were bred in this manner from larvæ of *Pygæra pigra*, Hufn., taken by Norgate in the New Forest. These larvæ perished after attaining the length of about 4 lines, and one *Petalodes* emerged from each through a hole in the posterior dorsal segments of the hardened skin. At Vienna this parasite has been reared by Giraud from *Heterogenea limacodes*, Hufn.

iii. Pelecystoma, *Wesm.*

Wesm., Nouv. Mém. Ac. Brux., 1838 p. 91.

Third joint of the maxillary palpi dilated internally, securiform; suturiform articulation distinct, crenulate; 3 cubital areolets, the 2d trapeziform; recurrent nervure interstitial; pobrachial areolet longer than the præbrachial; anal nervure not interstitial; terebra ♀ exserted. This genus approaches *Rhogas* and *Heterogamus* more nearly than any of the preceding, but differs in the unique structure of the maxillary palpi, the exserted terebra, and the 2d cubital areolet, which is not exactly rectangular.

1. *Pelecystoma lutea*, Nees. (Pl. III., figs. 6, 6*a*).

Rogas luteus, Nees, Mon., i., 218 (excl. synon.); Schäff., F. G., 156, 9.

Pelecystoma luteum, Wesm., Nouv. Mém. Ac. Brux., 1838, p. 92, pl., fig. 12 (wing); Reinh., Berl. ent. Zeit., 1865, p. 244, ♂ ♀; S. v. Voll., Pinac., pl. iv., f. 1 (with details of maxillary palpus and antenna).

Bracon luteus, Ratz., Ichn. d. Forst., ii., 36, ♂ ♀.

Testaceous; antennæ fuscous, except at the base, 2d joint much shorter than the 1st; stemmaticum, mandibles at the apex, and tips of the tarsi, black; abdominal segments 1—4 rugulose; terebra ♀ hardly equal to ¼ of the abdomen. ♂ ♀. Length, 3—4; wings, 6½ lines.

Antennæ ♀ somewhat longer than the body, 53-jointed in one British specimen; mesothorax very convex, sutures distinct, sides smooth, with an impressed line; metathorax rugose; 1st abdominal segment with a bifurcate carina from the base to the middle; wings hyaline, stigma and nervures testaceous, 1st intercubital transverse nervure somewhat oblique. The ♂ is similar.

The right of this species to be considered British is established by two females, one mutilated, in Fitch's collection; this was bred by Sang from a doubtful Geometer feeding on fir, *Ellopia prosapiaria*, L., *Thera firmata*, Hüb., or *variata*, Schiff. The other from *Heterogenea limacodes*, Hufn., by Raynor on June 22nd. Reissig and Goureau have both reared it on the Continent from this host. Wesmael describes also *P. tricolor*, not yet known as British, having the first two joints of the antennæ equal, and the abdomen fuscous in the middle, which Giraud has likewise obtained out of *Heterogenea*.

iv. HETEROGAMUS, *Wesm.*

Wesm., Nouv. Mém. Ac. Brux., 1838, p. 120.

This genus is not of equal value with the other genera of the present subfamily. It was made a subsection of *Rhogas* by both Haliday and Wesmael, differing only from that genus as follows :—

Second cubital areolet so narrow that the 1st abscissa of the radius is made longer than the 2d ; abdomen of the ♀ dilated from the base to the apex of the 3d segment, with rectilinear sides ; 4th and following segments retracted under the 3d, only the extreme apex protruding ; in the ♂, however, the 4th segment is half as long as the 3d, and the 5th and following retracted ; the antennæ of the ♀ are ringed with white (as in no other British Braconid, unless *Helcon annulicornis*, Nees, be indigenous) ; those of the ♂ are more slender in proportion (remarks Haliday) than the antennæ of any other Ichneumonideous insect.

1. *Heterogamus dispar*, Cur. (Pl. IV., figs. 1, 2).

Rogas dispar, Cur., B. E., dxii. ; Hal., Ent. Mag., iv., 103, ♂ ♀ ; S. v. Voll., Pinac., pl. iv., f. 3 (♀, with details of antenna).

Heterogamus crypticornis, Wesm., Nouv. Mém. Ac. Brux., 1838, p. 120, ♂ ♀.

♀. Rufo-testaceous, granulated ; thorax more or less, and apex of the abdomen, fuscous ; antennæ stout, tricolorous ; fore wings cinereous, hind wings hyaline. ♂ testaceous ; thorax more or less, and abdomen at the apex, fuscescent ; antennæ very slender ; wings hyaline. ♂ ♀. Stigma bicolorous. Length, 2½ ; wings, 4½ lines.

♀. Variable in colour ; testaceous, with the vertex and occiput fuscous, or with the head, thorax, and abdominal segments after the 2d, blackish ; antennæ 39—40-jointed, testaceous for ¼ of their length, then fuscous, then white, afterwards fuscous to the apex ; the white ring occupies 5—7 articulations ; palpi, trochanters, and anterior coxæ, whitish ; mesothoracic sutures effaced ; metathorax rugulose, elongate, cylindrical, truncate and bidenticulate at the apex ; abdominal segments 1—2 punctato-rugulose, longitudinally carinated ; segment 3 thickly punctulate ; legs slender, femora often fuscous at the apex ; stigma fuscous, yellow at the base ; a white streak or spot in the 1st cubital areolet, and the portion of the cubital forming its lowest side effaced by another white streak.

♂. Antennæ 42—43-jointed, fuscous, the two first joints testaceous ; variable in colour, the vertex, occiput, sides of the meso-

and metathorax, segment 1 at the base, 3 at the apex, and all the following, are liable to be black or infuscated; the segments after the 4th are always so; metathorax not bidenticulate.

Found in fir-woods in autumn, but not common. Taken by Haliday in Ireland and Scotland; in England by Curtis and Dale. I have captured the ♀ at Birch Wood, and among larches at Lidford, near Dartmoor, and a ♂ at Niton, Isle of Wight. Bridgman has taken the ♀ at Norwich.

v. RHOGAS, *Nees.*

Nees, Act. Ac. L. C., 1818, p. 306.

Third joint of the maxillary palpi simple. Abdomen linear or somewhat obovate, sessile; suturiform articulation distinct, crenulate; segments 1—3 subequal, longitudinally carinated in the middle, rugulose or aciculated; the remainder very short, but not retracted or concealed beneath the 3d. First cubital areolet receiving the recurrent nervure much before its apex; 1st abscissa of the radius shorter than the 2nd; pobrachial areolet longer than the præbrachial, and therefore the podiscoidal shorter than the prædiscoidal. Anal nervure not interstitial. Terebra subexserted.

The insects of this genus manifest a peculiar economy. They are solitary parasites of young lepidopterous larvæ, the bodies of which they do not quit at the time of pupation, but make their cocoons inside, protected by the indurated skins of the victims. The perfect *Rhogas* ultimately escapes through a hole bored in the posterior dorsal segments of the caterpillar. These facts, now well established, render improbable the account given by S. v. Vollenhoven of the production of *R. circumscriptus*, Nees, from a *Lophyrus* cocoon. And Brischke's remark on the breeding of another species from a *Nematus* is perhaps also erroneous. Whatever progress in the knowledge of this genus has been made since the writings of Haliday and Wesmael, is due to Reinhard's paper in the 'Berliner ent. Zeitschrift,' which has been here followed as closely as possible. Of the seven British species described by Haliday, only three (*gasterator*, *geniculator*, *bicolor*) retain the names which he assigned to them; while out of eight which he indicated as continental (Ent. Mag., iv., 104) four are now known to be indigenous. *R. irregularis*, *tristis*, *armatus*, *vittiger*, *nigricornis*, and *dimidiatus* are here added to the British list. On the other hand, *testaceus* has been rejected, for reasons which will be stated hereafter. The instability of the colours renders the determination of the species difficult, and their exhibition in a tabular form still more so.

TABLE OF SPECIES.

(16) 1. Legs rufous; ground colour of the body black, with or without rufous markings. In other words, the pale portions of the body (if any) are rufous, not testaceous.

(3) 2. Podiscoidal areolet only $\frac{1}{2}$ as long as the prædiscoidal .. .. .. 2. *reticulator*, Nees.

(2) 3. Podiscoidal areolet $\frac{2}{3}$—$\frac{3}{4}$ as long as the prædiscoidal.

(11) 4. Fourth abdominal segment shining, not margined beneath at the sides.

(6) 5. Antennæ 60-jointed .. .. .. 1. *dissector*, Nees.

(5) 6. Antennæ with fewer than 60 joints.

(8) 7. Palpi testaceous; hind tibiæ yellow with black tips .. .. .. 3. *irregularis*, Wesm.

(7) 8. Palpi fuscous; hind tibiæ rufous with black tips; (in *gasterator* ♂, yellowish at the base).

(10) 9. Mesopleuræ with a rugose dull fovea; antennæ ♀ not more than 40-jointed, shorter than the body .. .. 4. *dimidiatus*, Spin.

(9) 10. Mesopleuræ with a punctate shining fovea; antennæ ♀ 54-jointed, as long as the body .. .. .. 5. *gasterator*, Jur.

(4) 11. Fourth abdominal segment (like the 3 preceding) dull, margined beneath at the sides.

(13) 12. Segment 1 distinctly longer than 2, contracted at the base; body elongate, slender .. .. 7. *tristis*, Wesm.

(12) 13. Segment 1 scarcely longer than 2, hardly contracted at the base; body short, stout.

(15) 14. Antennæ 48—52-jointed .. .. 6. *geniculator*, Nees.

(14) 15. Antennæ 37—40-jointed .. .. 8. *bicolor*, Spin.

(1) 16. Legs testaceous; ground colour of the body testaceous, more or less varied with black. In other words, the pale portions of the body (if any) are testaceous, not rufous.

(18) 17. Antennæ 35—40-jointed .. .. 10. *circumscriptus*, Nees.

(17) 18. Antennæ with more than 40 joints.

(20) 19. Black species (not variable), with a testaceous spot on the abdomen; belly black .. .. 9. *nigricornis*, Wesm.

(19) 20. Testaceous species, with some parts black or fuscous; belly pale.

(22) 21. Head and mesothorax testaceous, immaculate; stigma yellow, sometimes fuscous at the apex .. .. .. 12. *armatus*, Wesm.
(21) 22. Head and mesothorax more or less black; stigma fuscous, with a pale spot at the base .. .. .. 11. *vittiger*, Wesm.

1. *Rhogas dissector*, Nees.

Rogas dissector, Nees, Mon., i., 208, ♂; Reinh., Berl. ent. Zeit., 1863, p. 252, ♂ ♀; S. v. Voll., Pinac., pl. iv., fig. 4.

R. rugulosus, Hal., Ent. Mag., iv., 97, ♂ ♀ (nec Nees).

Black, mouth and legs rufous, the latter stouter than in the other British species; hind tibiæ pale, broadly black at the apex; hind tarsi black. Mesopleuræ smooth and shining, rugose above, thinly punctulate on the hinder margin. Abdomen attenuated at the base, ruguloso-punctate. Second cubital areolet about twice as broad as its length; 1st intercubital nervure oblique. ♂ ♀. Length, $3\frac{1}{4}$—$3\frac{2}{3}$; wings, $5\frac{1}{2}$—7 lin.

Antennæ somewhat longer than the body, black, about 60—64-jointed, a number reached by no other British species. Face transversely rugose. Mandibles rufous; palpi fuscous or rufescent. Mesopleuræ often with a longitudinal rufous stripe. Metathorax flattened, ruguloso-punctulate, with a medial carina. Abdomen narrower than in the other species, gradually widening to the end of the 3d segment; segments 1—2, and 3 at the base, rugulose, the rest smooth and shining; segment 1 at the apex twice as broad as its base; segment 2 as long as its basal breadth. Abdomen of the ♀ somewhat compressed at the apex; terebra very short. Wings ample; 2d cubital areolet as long as the podiscoidal; stigma more attenuated than usual at the apex; radial areolet narrow. Coxæ rufous; hind femora subinfuscated at the apex.

Var. *α*. Abdomen wholly black.

Var. *β*. Segment 1 at the apex more or less, and 2 entirely, piceous.

Var. *γ*. Segments 1—2 bright rufous.

I have not seen this species, which, according to Haliday, is not rare in Ireland, frequenting umbelliferous flowers in autumn. In Reinhard's table it is ranked among species with the abdomen wholly black, which, considering the varieties mentioned by Nees and Haliday, may sometimes lead to difficulty. The true *rugulosus*, Nees, has not yet been identified in England; it has been bred by Brischke from *Acronycta euphorbiæ*, Fab., and *A. abscondita*, Tr.

2. *Rhogas reticulator*, Nees.

Bracon gasterator, varr. 1, 2, Spin., Ins. Lig., ii., 121 (nec Jurine).

Rogas reticulator, Nees, Mon., i., 211; Reinh., Berl. ent. Zeit., 1863, p. 260, ♂ ♀; S. v. Voll., Pinac., pl. iv., fig. 5.

R. nobilis, Cur., B. E., 512; Hal., Ent. Mag., iv., 98.

Black, mandibles, and abdominal segments 1, 2, and 3 at the base, rufous; legs variable. Mesopleuræ smooth and shining, rugose above. Abdomen hardly narrowed at the base, rather short; segment 1 not longer than its apical breadth, 2 transverse, both striato-rugose; 3 striolated at the base, very smooth and shining at the apex, like the 4th and following, which in the ♂ are covered with adpressed yellowish hairs, the middle and the apical margin being glabrous. Podiscoidal areolet only ½ as long as the prædiscoidal, by which the species may be distinguished from every other. Second cubital areolet subquadrate. ♂ ♀. Length, 2⅓; wings, 5 lin.

Antennæ as long as the body, about 50-jointed; palpi black, seldom testaceous. Mesothorax sparingly punctate, more shining than in the other species. Mesopleuræ sometimes obsoletely impressed with a longitudinal rugose fovea. The hair of the ♂ is often worn away; the ♀ exhibits only a thin pubescence.

Var. *a*. Legs black, 1st pair of knees and tibiæ fuscous.

Var. *β*. Legs rufous, coxæ of the 1st, or 1st and 2d pairs, knees of the 2d and 3d, tibiæ of the 3d, and all the tarsi, black. This is described by Nees as the typical form.

Var. *γ*. Antennæ at the base beneath, and legs, rufous; femora and tibiæ of the 3d pair, and all the tarsi, black at the apex. *R. nobilis*, Cur.

This and the preceding are the only species I have not seen; both occur in Holland; and Reinhard gives the distribution of *reticulator* from England to Syracuse. Taken by Haliday in Ireland, near Holywood, Belfast, ♂; and by Dale at Monk's Wood, near Cambridge.

3. *Rhogas irregularis*, Wesm. (Pl. IV., fig. 3).

Alciodes irregularis, Wesm., Nouv. Mém. Ac. Brux., 1838, p. 101, ♂.

Rogas irregularis, Reinh., Berl. ent. Zeit., 1863, p. 260, ♂ ♀; S. v. Voll., Pinac., pl. iv., f. 11 (head).

Black; palpi testaceous; mandibles, abdominal segments 1 at the apex, 2 entirely, and 3 at the base, rufous; 3d pair of tibiæ pale yellow, their apex and tarsi, as well as the last joint of the other tarsi, black; 3d and following abdominal segments very shining; spurs of the 3d pair of tibiæ stout, blunt. ♂ ♀. Length, 3—3½; wings, 6—6½ lin.

Antennæ ♂ 55—57-, ♀ 52—54-jointed, as long as the body, or longer. Mesopleuræ shining, minutely punctulate, rugose under the wings, and with a rugose fovea below. Abdomen elongate, in the ♀ somewhat compressed at the apex, terebra subexserted; segments 1—2 rugulose, carinated, 3 rugulose at the base. Second cubital areolet transverse, a little shorter than the podiscoidal; stigma blackish.

Var. *a*. First abdominal segment wholly rufous, or with a single black spot.

This species may be recognised by the yellow hind tibiæ, tipped with black, and the very shining apex of the abdomen. The ♂ of *gasterator* has the base of the hind tibiæ narrowly and indistinctly yellowish, but the rest is rufous.

Appears to be not uncommon, yet has hitherto escaped notice. Bridgman has taken eight males and six females in Norfolk, in May and June; I have a pair in bad condition found near Leicester; taken by Fitch at Maldon and Harwood at Colchester; W. H. B. Fletcher bred a pair from *Hadena unanimis*, Tr.

4. *Rhogas dimidiatus*, Spin.

Bracon dimidiatus, Spin., Ins. Lig., iii., 125, ♀.
Rogas dimidiatus, Nees, Mon., i., 214, ♀; Reinh., Berl. ent. Zeit., 1863, p. 257, ♂ ♀; S. v. Voll., Pinac., pl. iv., f. 6.
Aleiodes nigripalpis, Wesm., Nouv. Mém. Ac. Brux., 1838, p. 97, ♂.
A. brevicornis, Wesm., *lib. cit.*, p. 98, ♀.
Rogas ruficornis, Schäff., F. G., clvi., 10, ♀.

Male. Black; mandibles, abdominal segments 1—2, base of 3, and legs, rufous; coxæ (or only the 1st pair), 1st joint of the trochanters, 3d pair of femora and tibiæ at the apex, with their tarsi, black. Antennæ as long as the body, about 52-jointed, black, rarely rufous at the base. Wings subinfuscated, scarcely extending beyond the apex of the abdomen.

Female. Rufous; palpi, genæ, apex of the antennæ, pectus, metathorax, 3d and following abdominal segments, and apex of the 3d pair of femora, black, their tarsi fuscous. Antennæ rather stout, distinctly shorter than the body, 37—40-jointed (in my specimen 45-jointed), rufous on the basal half of the flagellum. Terebra hardly visible. Wings short, as in the ♂, somewhat darker, with a hyaline stripe. Length, $2\frac{1}{3}$—3; wings, $4\frac{2}{3}$ lin.

♂ ♀. Mandibles rufous, palpi black; eyes small and not very prominent, whereby the vertex behind them appears scarcely narrowed, and the inferior margin of the eyes is above the upper margin of the oral aperture. Mesopleuræ punctate, somewhat shining, rugose under the wings, with a dull rugose fovea below. Abdomen short and stout, segments 1—2 striato-rugose, 3d at the apex, and all the following, smooth and shining; segment 1 sometimes with a basal black spot, not longer than its apical breadth, very slightly narrowed at the base; 2d transverse; 3d and following with very fine scattered hairs. Second cubital areolet transverse, a little shorter than the podiscoidal.

Var. *a*. A facial spot, base of the antennæ, mesothoracic sutures, scutellum, and two spots on the metathorax, rufous. ♂.

Var. β. Head and thorax more or less fuscous or black; mandibles rufous. ♀.

? Var. γ. Metathorax rufous.

I have a ♂ taken at Niton, Isle of Wight, another from the Pyrenees, and a ♀ from Darenth Wood. The last has the metathorax rufous; the antennæ are not quite as long as the body, 45-jointed; the infuscated wings, and the tarsi, are shorter than in *gasterator*, to which I should otherwise have referred this specimen. *R. dimidiatus* is widely diffused in Europe, from the Baltic to the Mediterranean; its occurrence in England is therefore nothing remarkable. Giraud records it as a parasite of *Bombyx quercus*, L., and *Nemeophila russula*, L. The Vienna Museum contains a specimen of var. β. (head and thorax black) bred from *Caradrina alsines*, Brahm (Berl. Ent. Zeit., 1865, p. 243).

5. *Rhogas gasterator*, Jurine.

Bracon gasterator, Jur., Hym., pl. viii., Gen. 3, ♀, ant., mand. (nec Spin.).

Rogas gasterator, Nees, Mon., i., 212, ♂ ♀; Hal., Ent. Mag., iv., 99 ♀ (not the ♂); Reinh., Berl. ent. Zeit., 1863, p. 259, ♂ ♀.

Colours as in the preceding, but the hind tibiæ of the ♂ are yellowish at the base. Eyes large; vertex a little narrowed posteriorly. Antennæ ♂ ♀ as long as the body, of the ♂ 53—58-jointed; in the ♀ the base of the flagellum is rufous. Mesopleuræ with a smooth subobsolete fovea. Length, 3—$3\frac{1}{2}$; wings, $5\frac{1}{2}$—$5\frac{3}{4}$ lin.

The ♀ may be separated from that of *dimidiatus* by the much longer antennæ and wings. The ♂ is more difficult to distinguish. Reinhard, after remarking that the identity of the sexes brought together under this species is not free from doubt, discriminates the ♂ of *gasterator* as follows:—The eyes are larger than in *dimidiatus*, and their inferior margin is situated lower down than the upper margin of the oral cavity; they are also more prominent laterally, causing the vertex to appear somewhat narrowed behind. The mesopleuræ are more shining, much more sparingly punctate; the longitudinal furrow is very faintly impressed and entirely smooth, or it is indicated by a small hardly shining fold. The antennæ are usually black. Those of the ♀ are dull rufous from the base of the 3d joint to about the middle. The wings are distinctly longer than the abdomen, and subhyaline; the neuration agrees with that of *dimidiatus*. The palpi are fuscous, paler at the tips.

I possess two males with 54-jointed antennæ, taken near Abergavenny in June, and four from an osier-bed at Nunton, Wilts, whose antennæ are 53-, 55-, 56-, and 58-jointed; but the ♀ is unknown to me.

6. *Rhogas geniculator*, Nees.

Bracon rugulosus, var. *β*, Nees, Mag. Ges. Berl., 1811, p. 33, ♂.

Rogas geniculator, Nees, Mon., i., 211, ♂; Hal., Ent. Mag., iv., 99, ♂; Reinh., Berl. ent. Zeit., 1863, p. 262, ♂ ♀.

Aleiodes geniculator, Wesm., Nouv. Mém. Ac. Brux., 1838, p. 118, ♂ ♀, pl., fig. 13 (wing); Ratz., Ichn. d. Forst., iii., 34, ♂ ♀.

Rogas signatus, Nees, Mon., i., 210, ♂.

R. annulipes, Schäff., F. G., clvi., 8.

R. alternator, Nees, Mon., i., 213, ♂; Hal., Ent. Mag., iv., 100.

Aleiodes alternator, Wesm., Nouv. Mém. Ac. Brux., 1838, p. 119, ♂.

Rogas balteatus, Cur., B. E., pl. dxii., ♂.

Variable; black, orbits behind, abdominal segments 1—2, 3 at the base, and legs, rufous; femora and tibiæ (except the 1st pair) generally tipped with black. Mesopleuræ obscure, rugulose above, and more coarsely sculptured in the wide longitudinal fovea; a small space behind, next to the metathorax, smooth and shining.

Abdomen hardly narrowed at the base, segments 1—4 margined at the sides underneath; segment 1 rather longer than its apical breadth; 2 transverse; 4 and the following punctato-rugulose, not shining. Abdomen of the ♀ subcompressed at the apex; terebra subexserted. Wings nearly hyaline; 2d cubital areolet slightly transverse, a little shorter than the podiscoidal; stigma fuscous, with a pale spot at the inner angle.

Antennæ about as long as the body, 48—52-jointed, often brownish beneath. Mandibles and palpi varying from fuscous to testaceous. Vertex moderately narrowed behind the eyes.

Var. *α*. Abdominal segments 1—3 black, with rufous margins. (*R. signatus* and *annulipes*).

Var. *β*. Abdomen black, disk of the 2d segment rufous; coxæ black.

Var. *γ*. Rufous; head, scutellum, metathorax, and abdomen at the apex, black. (*R. alternator* and *balteatus*).

Var. *δ*. Pro- and metathorax rufous, variegated with black above; mesothoracic sutures, abdominal segments 1—3, and base of 4, rufous.

Var. *ε*. Rufo-testaceous; vertex, pectus, and metathorax above, varied with black.

Described in the Ent. Mag., iv., 99, from specimens taken by Walker in Jersey and England. The var. *balteatus* was found by Haliday near the harbour of Donaghadee. Frausen at Rotterdam, according to S. v. Vollenhoven, and Bignell, near Plymouth, have bred males and females from young larvæ of *Odonestis potatoria*, L., found in the spring; the transformations taking place within the dried skin of the victim. Infested larvæ of this moth may be found in April and May, resting on various grasses, and apparently prepared to moult for the fourth time. Instead of moulting, they gradually contract and perish, retaining the same position. The *Rhogas* escaped through a perforation, in one case, of the 9th and 10th segments. Bred by Brischke, June 30th, from *Hedya ocellana*, Hüb.; July 6th, from *Orgyia gonostigma*, Fab.; also from *O. antiqua*, L., *Dasychira selenitica*, Esp., and an undetermined *Tortrix*. According to Giraud, bred by Perris from *Triphæna fimbria*, L.; and, according to Reinhard, from *Arctia caia*, L., *Porthesia*, &c.

7. *Rhogas tristis*, Wesm.

Rogas bicolor, var. *β*, Nees, Mon., i., 214, ♂ ♀.
Aleiodes tristis, Wesm., Nouv. Mém. Ac. Brux., 1838, p. 114, ♂ ♀; S. v. Voll., Pinac., pl. iv., f. 10 (with base of antenna).
Rogas tristis, Reinh., Berl. ent. Zeit., 1863, p. 263, ♂ ♀.

Black, palpi and mandibles pale; orbits and thorax more or less rufous; legs rufo-testaceous, femora of the 2d and 3d pairs often black at the apex. Vertex behind the eyes much narrowed, the sides subrectilinear. Mesopleuræ dull, rugulose, with a smooth shining space near the metathorax. Abdomen elongate, rugulose, very little narrowed at the base, segments 1—4 margined beneath at the sides, segment 2 subquadrate. Wings nearly hyaline, stigma narrow, acuminate, testaceous, bordered with fuscous. Terebra subexserted. Length, 2½; wings, 5 lin.

Antennæ as long as the body, 45—48-jointed in the ♂, 41—44-jointed in the ♀ (in the British specimen, 45-jointed), sometimes testaceous at the base. Body covered with thin greyish pubescence. Abdominal segments 1—3 rugulose, apex of the 3d more finely, 4th and following punctulate and slightly shining. The legs are rufous inclining to testaceous, intermediate in colour between the two sections in the table of species. The femora are sometimes more than half black.

Var. *α*. Thorax entirely black.

Var. *β*. Prothorax above and at the sides, and mesothorax above, rufous.

Var. *γ*. Head entirely and coxæ partly, black.

Var. *δ*. Like the last, but the palpi and mandibles fuscous.

Var. *ε*. Head rufous, a black spot on the face, vertex, and occiput.

This must be carefully distinguished from *R. bicolor*. It is a trifle larger, and more slender in proportion; the antennæ have more joints; the head is longer (*i. e.*, not so transverse), more distinctly narrowed behind the eyes, and with the sides much less rounded; the eyes are larger and more prominent; the thorax somewhat flatter; and in respect of colours (although these are very variable), the legs of *tristis* are constantly and decidedly marked with black, while in *bicolor* only the 3d pair of femora are exceptionally tipped with that colour. The head of the ♀ *bicolor* is nearly always rufous; that of *tristis* black, with the orbits more or less pale.

R. modestus, Reinh., according to the description, is very similar, but has the mesopleuræ smooth and shining.

Discovered near Plymouth by Bignell, and taken also by Capron. Bignell's specimen is a ♀ with the head and body entirely black, and the four posterior femora very broadly tipped with that colour. Fitch has two specimens agreeing best with var. β. It is a widely distributed species in Europe. Brischke bred it from *Eupithecia pimpinellata*, Hüb., with *R. modestus*.

8. *Rhogas bicolor*, Spin.

Bracon bicolor, Spin., Ins. Lig., ii., 128.

Rogas bicolor, Nees, Mon., i., 213; Hal., Ent. Mag., iv., 100, ♂ ♀ (excl. syn. *R. prærogator*, Nees); Reinh., Berl. ent. Zeit., 1863, p. 263, ♂ ♀; S. v. Voll., Pinac., pl. iv., f. 7 (with profile of abdomen, posterior coxa, and palpus).

Alciodes bicolor, Wesm., Nouv. Mém. Ac. Brux., 1838, p. 116, ♂ ♀.

Rogas zygænæ, Nees, Mon., i., 210.

R. ater, Cur., B. E., 512.

Black, usually with black palpi and pale mandibles; head, thorax, and scutellum of the ♀ rufous, of the ♂ varied with rufous; legs rufous; vertex behind the eyes rounded at the sides. Mesopleuræ as in the preceding. Abdomen shorter and broader. Wings similar, but the stigma is less attenuated, oval, fuscous, with a pale spot at the base, or wholly testaceous. Length, 2½—3¼; wings, 4½—5½ lin.

Antennæ 37—40-jointed. First abdominal segment hardly longer than its apical breadth; 2d in the ♂ somewhat longer than broad, in the ♀ transverse.

Var. α. Body and coxæ black, legs rufous. (*R. zygænæ*).

Var. β. Mouth, orbits, and legs rufous; 3d pair of knees and tarsi fuscous. (*R. ater*).

Var. γ. Head black, orbits behind rufous; thorax black; 1st abdominal segment at the sides, 2d wholly, except a discal spot, 3d at the sides and basal angles, rufous.

It would be useless to give more colour-varieties. The most usual forms presented are (1) head and thorax rufous, and (2) entirely black, except the legs.

Has been found in England, Scotland, and Ireland; generally, according to Haliday, on sandy sea-coasts. Var. α was reared by Nees von Esenbeck from the larvæ of *Zygæna filipendulæ*, L., which, before attaining its full growth, attached itself by the fore legs to a blade of grass and perished, the skin after death preserving its natural form and colour. The parasite emerged from an irregular hole near the tail, on July 7th, 1810. So far Nees; and his observation is confirmed by the breeding of var. γ from the same *Zygæna* at Shedfield, Hants, by Mrs. Jenkyns (see pl. iv., fig. 3*a*). Reinhard says of three specimens bred from *Zygæna*, that two females were the typical *bicolor*, and the male was *zygænæ*, leaving no doubt as to the correctness of the synonymy. A black var. in my collection is accompanied by the larva-skin of *Lioptilus tephrodactylus*, Hüb., from which it was bred by R. C. R. Jordan (*cf.* E. M. M., vi., 138). Brischke obtained the species from *Ino pruni*, Schiff.; and Von Heyden, according to Reinhard, a ♀ var. from a hairy larva feeding upon *Ononis*, perhaps *Mimescoptilus phæodactylus*, Hüb.

9. *Rhogas nigricornis*, Wesm.

Aleiodes nigricornis, Wesm., Nouv. Mém. Ac. Brux., 1838, p. 105; Ratz., Ichn. d. Forst., iii., 33, ♂ ♀.
Rogas nigricornis, Reinh., Berl. ent. Zeit., 1863, p. 267, ♀.

Black; palpi, mandibles, legs, and an oblong medial spot on the abdomen, testaceous; orbits above and behind, meso- and metathorax beneath and at the sides, and sometimes the scutellum, rufescent. Eyes large, vertex narrowed posteriorly. Antennæ 45—50-jointed, wholly black, or fuscous beneath. Mesopleuræ granulated, somewhat shining; fovea obsolete. Abdomen elongate, of the ♀ almost obovate; 1st segment ½ longer than its apical breadth, three times broader at the apex than at the base; 3d segment broader than the 2d; segments 1—2, and 3 at the base, finely rugulose, more distinctly so at the sides; the rest punctulate, slightly shining. Terebra subexserted. Wings hyaline, stigma testaceous, bordered with fuscous along the radial areolet; 2d cubital areolet about twice as broad as its length, not shorter than the podiscoidal. Length, 3; wings, 6 lin.

This must be carefully distinguished from the dark varieties of *circumscriptus*. It is larger, the antennæ are black, and have more joints; the legs are uniform testaceous, with a rufous tinge; the vertex is rectilinearly narrowed behind the eyes; the abdomen is more strongly contracted at the base, and less convex, black, with a pale spot on the 2d segment; the mesopleuræ are more finely granulated and more shining; the wings are proportionally larger; the colours are not subject to variation. The sexes are similar.

This species has not hitherto been noticed in England. It is not uncommon near Abergavenny in July, where it seems to take the place of *circumscriptus*; also taken at Braemar, Bugbrook and Maldon. According to Ratzeburg, it occurs in corn-fields and grassy places. He bred several specimens from naked 16-footed (*Tortrix ?*) larvæ, the name of which is not given.

Reinhard says that Brischke bred a female from *Calocampa solidaginis*, Hüb.; Brischke gives it himself in his Wirths-Tabelle from *Xylophasia rurea*, Fab.

10. *Rhogas circumscriptus*, Nees.

Rogas circumscriptus, Nees, Mon., i., 216; Schäff., F. G., clvi; Reinh., Berl. ent. Zeit., 1863, p. 269, ♂ ♀; S. v. Voll., Pinac., pl. iv., ff. 8, 9 (with wing).
Aleiodes circumscriptus, Wesm., Nouv. Mém. Ac. Brux., 1838, p. 106, ♂ ♀.
Rogas pictus, Schäff., F. G., clvi.
R. testaceus, Hal., Ent. Mag., iv., 101 (nec Nees).
Bracon circumscriptus, Ratz., Ichn. d. Forst., ii., 35; iii., 33 (partly).
Aleiodes nigriceps, Wesm., *lib. cit.*, p. 109, ♀.

Variable, testaceous, more or less marked with black; abdomen often black above, with an elongate medial testaceous patch, as in the preceding species. Antennæ 35—41-jointed, testaceous, fuscous at the apex. Mesopleuræ dull, granulated, rugose under the wings, and with an obsolete rugose fovea. Abdomen of the ♂ elongate, segment 1 half as long again as its apical breadth, segment 2 a little longer than broad; of the ♀ somewhat obovate, segment 1 scarcely longer than its apical breadth, 2 somewhat transverse. The 3d segment in both sexes is broadest, its apex, and the following segments, punctulate, rather shining. Wings hyaline, stigma testaceous, often with a fuscous apical spot; 2d cubital areolet twice as broad as its length, somewhat narrowed exteriorly, longer than the podiscoidal; radius of the hind wings obsolete. Terebra concealed. Length, 2¼—2½; wings, 4—4¾ lin.

Antennæ as long as the body, with fewer joints than in any other

British species. Metathorax granulated, with a faint medial carina. Abdominal segments 1—3 finely rugulose, more distinctly at the sides, in the middle often only granulated; the carina of the 2d segment seldom visible. This may be regarded as the typical form of the 2d section of *Rhogas*, comprising Spp. 9—12. They make an approach to *Clinocentrus*, and differ from the rest of the genus in the substitution of a paler tint instead of red; their wings are longer in proportion, the stigma larger, the præ- and pobrachial areolets of the hind wings wider, and the radius of the same wings indistinct: the joints of the antennæ are fewer in number.

The numerous colour-varieties are arranged by Reinhard as follows:—

A. Head, prothorax, mesothorax, and legs, testaceous.

Var. *α*. Testaceous, uniform: apex of the abdomen in the ♂ sometimes black. Or the metathorax and 1st segment are black above. (*Aleiodes nigriceps*, Wesm.).

Var. *β*. The same, but the abdomen is black, with a pale oblong spot, as in *nigricornis*. Sometimes there is a black stripe under the wings.

Var. *γ*. Abdomen wholly, and pectus partly, black.

B. Head black, with testaceous mouth and orbits; metathorax, 1st abdominal segment, anus, and 3d pair of femora broadly at the apex, blackish or fuscous.

Var. *δ*. Prothorax, mesothorax, and abdominal segments 2—3, testaceous.

Var. *ε*. The same, but with a trilobed black spot on the mesothorax.

Var. *ζ*. Like the last, but the abdomen is black, with a medial testaceous spot.

Var. *η*. Like the last, but the pro- and mesothorax are black, the scutellum rufescent, and there is a black stripe under the wings. Or the scutellum and a pectoral spot are black.

The dark varieties must not be confounded with *nigricornis*, Wesm.

By far the commonest species. Bred by Bignell from half-grown larvæ of *Ebulea crocealis*, Hüb., June 20th, *Tæniocampa stabilis*, View., July 5th, and *Melanippe galiata*, Hüb., Sept. 21st. Four males by W. H. B. Fletcher from *Cucullia verbasci*, L. The larvæ after death continue to cling to their food-plant, the parasites complete their transformations inside, and finally emerge through a hole in the 10th—12th segments. The species has been reared on the Continent from *Agrotis agathina*, Dup.; by Brischke from *Caradrina alsines*, Brahm, *Noctua baia*, Fab., *Eupithecia castigata*, Hüb., *Anticlea rubidata*, Fab., *Tortrix rosana*, L., and *Dictyopteryx Holmiana*, L. Ritsema found it with *Rhogas testaceus*, Spin., in birds' nests at Haarlem in January, showing that it hybernates as an imago.

The synonym *R. pallidus*, Bouché, ought to be erased, as referring to *R. testaceus*, Spin. The occurrence of the latter species in this country is merely hypothetical. The name was introduced by Haliday, who, relying upon the descriptions of Spinola and Nees, confused it with *circumscriptus*, and treated that name as a synonym. It is necessary therefore to discard *testaceus* until some one can produce an authentic British specimen. From a remark of Haliday it seems certain that no specimens of that species were mixed up with those which he examined. Had this been the case he would not have said (Ent. Mag., iv., 102) that the antennæ of *testaceus* possess more joints than those of *circumscriptus*. *Rhogas testaceus* (Spin., Ins. Lig., ii., 131; Reinh., Berl. ent. Zeit., 1863, p. 270) has the antennæ 33—35-jointed; the 1st abdominal segment in the ♂ is at most as long as its apical breadth; in the ♀, distinctly shorter; the 2d segment in the ♂ is slightly transverse, in the ♀ conspicuously so. The colour is uniform testaceous, or the metathorax and 1st abdominal segment are marked with fuscous. It is a parasite of *Dicranura vinula*, L., *bifida*, Hüb., *Tortrix rosana*, L., *Depressaria applana*, Fab., *Cilix glaucata*, Scop., *Porthesia auriflua*, L., *Plusia gamma*, L., and *Eupithecia sobrinata*, Hüb. Compare Ratz., Ichn. d. Forst., ii., 35, pl. ii., fig. 4 (wing).

11. *Rhogas vittiger*, Wesm.

Aleiodes vittiger, Wesm., Nouv. Mém. Ac. Brux., 1838, p. 112, ♀.

Rogas vittiger, Reinh., Berl. ent. Zeit., 1863, p. 267, ♂ ♀.

R. seriatus, Schäff., F. G., clvi., 12.

Pale testaceous; occiput, or whole head (except the orbits), disk of the thorax (except the scutellum), a patch beneath the wings. 1st abdominal segment almost to its apex, and 3d pair of femora broadly at the apex, black; tips of the antennæ, and two oblong spots on the 2d segment, sometimes on the 3d also, fuscous. Eyes large, vertex narrowed behind. Antennæ 42—52-jointed, slender, longer than the body. Mesopleuræ very finely granulated, somewhat shining. Abdomen elongate, obovate, broadest at the end of the 3d segment, then abruptly rounded; 1st segment half as long again as its apical breadth, which is double the basal breadth; segments 1—3 minutely rugulose, the rest more shining, punctulate. Wings hyaline, stigma fuscous, with a pale basal spot; 2d cubital areolet twice as broad as its length, twice as wide as, and a little longer than, the podiscoidal. Terebra subexserted. Length, 2½; wings, 4¾ lin.

Var. *a*. Pro- and mesothorax pale, the latter with three dusky stripes; metathorax pale at the sides.

In Reinhard's table of species this is separated from *circumscriptus* only by the form of the vertex, which is straight behind the eyes, instead of rounded. The ground colour is a remarkably pale testaceous, almost transparent, the coxæ and trochanters nearly colourless. According to Wesmael (*lib. cit.*, p. 95, note) the 1st intercubital nervure is slightly oblique. I possess an old female specimen taken at Barnstaple, which almost certainly belongs to this species, although not in a condition to exhibit some of the characters very distinctly. The 52-jointed antennæ, the form of the abdomen, &c., show that it cannot be *circumscriptus*.

12. *Rhogas armatus*, Wesm.

Aleiodes armatus, Wesm., Nouv. Mém. Ac. Brux., 1838, p. 112, ♂.

Rogas armatus, Reinh., Berl. ent. Zeit., 1863, p. 268, ♂ ♀.

Testaceous, immaculate, or with the metathorax, and abdomen at the base and apex, fuscescent. Eyes large; vertex behind them with straight sides; genæ of the ♂ ending in a vertical tooth, those of the ♀ unarmed. Antennæ 40—44-jointed, as long as the body Mesopleuræ very finely granulated, somewhat shining, the fovea obsolete. First abdominal segment of the ♂ ½ longer, of the ♀ only a little longer, than its apical breadth, the apex twice as broad as the base; segment 2 quadrate; 3 not broader than 2, its apical margin and the remaining segments punctulate, somewhat shining. Wings hyaline, stigma testaceous, sometimes fuscous at the apex; neuration as in the preceding; radius of the hind wings obsolete. Length, 2½; wings, 4¾ lin.

Differs from *circumscriptus* in the proportions of the 1st abdominal segment, and the number of joints in the antennæ. The abdominal segments 1—3 are very minutely striolated, not shining.

A male and two females of this new British species, in fine condition, are in Fitch's collection. Hitherto taken in Belgium, Austria, and Switzerland.

II. CRYPTOGASTRES.

X. SIGALPHIDES.

Clypeus entire; mouth closed; maxillary palpi 6-, labial 4-jointed; occiput margined. Abdomen broadly sessile; segments 1—3 connate above, forming a carapace, usually with two superficial, crenulate sutures; the remaining segments concealed, or (i *Allodorus*) very briefly exserted. Two cubital areolets; recurrent nervure rejected; radial areolet ovate, acuminate, not reaching the apex of the wing; præ- and pobrachial areolets subequal. Terebra elongate.

The original genus *Sigalphus*, Latr. (1802) included the subfamilies *Sigalphides*, *Chelonides*, and *Calyptides*. The *Chelonides* were separated in 1807 by Jurine. Nees von Esenbeck, in 1834, divided *Sigalphus* into two sections, the 1st comprising the *Sigalphides* proper (with a mixture of *Calyptus*); the 2d containing two species now referred to the *Alysiides*. Haliday, in 1835, gave the name *Triaspis* to Von Esenbeck's first section, distinguishing *Calyptus*; and in the same year Wesmael independently established the same divisions, but under the names *Sigalphus* and *Brachistes*. Finally, the appropriate creation of the genus *Allodorus* by Förster, in 1862, reduces *Sigalphus* to its lowest terms. The *Sigalphides* and *Chelonides* are nearly connected by their abdominal structure, although differing in the wings and terebra. They formed together the group *Cryptogastres* of Wesmael, which, as represented in Europe, is entirely isolated, though some of the exotic genera (*Spinaria*, *Fornicia*) exhibit a certain affinity to the *Bracon* type.

The two British genera may be thus distinguished:—

Segments 4—5 not entirely concealed under the carapace; the 2d longer than the 3d; axillary areolet bisected before the apex by a transverse nervure	i. ALLODORUS.
Segments 4—5 entirely concealed; the 2d shorter than the 3d; axillary areolet undivided ..	ii. SIGALPHUS.

i. ALLODORUS, *Först.*

Först., Verh. pr. Rheinl., 1862, p. 242.

Head broadly transverse, vertex short; mandibles bifid. Prothorax distinct; metathorax with a tooth on each side. Abdomen longer and less convex than in *Sigalphus*, rimulose, not shining; carapace triarticulate, segment 1 longer than broad, somewhat narrowed anteriorly, bicarinated; segment 2 broadest, longer than 3; segments 4—5 very briefly exserted. Radial areolet longer than in *Sigalphus*, almost reaching the apex of the wing; cubitus and anal nervure distinct; axillary areolet with an additional inchoate transverse nervure near the middle. Terebra elongate.

This genus has never been described before, and I possess only one ♂ specimen from which to derive characters. *Allodorus semirugosus*, Nees, is given in the Catalogue, p. 101, but appears to me now too dubious to be retained as a British insect. *Sigalphus glypturus*, Thoms., Opusc. Ent., vi., 1874, p. 559, apparently belongs to this genus.

1. *Allodorus lepidus*, Hal. (Pl. IV., fig. 4).

Triaspis lepidus, Hal., Ent. Mag., iii., 125, ♂ ♀.
Allodorus pallidus, Reinh., MS. in litt., ♂.

Black, antennæ at the base beneath, mouth, palpi, and legs, testaceous; hind tibiæ and tarsi fuscescent; abdomen obovate, rimulose. The ♂ has the vertex, stemmaticum, and occiput, black; the rest of the head, the prothorax, and the mesopleuræ anteriorly, testaceous. Terebra ♀ as long as the abdomen. Length, 1½—2½; wings, 3¾—5 lin.

Head wider than the thorax, flattened in front and behind, vertex transversely convex, mandibles concealed under the clypeus. Antennæ ♀ shorter than the body, 29-jointed, pubescent, convoluted at the apex, the exterior joints very short, pateriform; those of the ♂ longer than the body, slender, 30—31-jointed (30-jointed in my specimen); thorax ♂ more attenuated at both ends than that of the ♀, metathorax rugulose, with a smooth basal space; abdomen longer, obovate, thickly and irregularly striolated, not shining, subpiceous in the middle; beneath carinated, hardly concave, testaceous; 1st segment twice as broad at the apex as at the base, with two carinæ converging towards, but not reaching, the apex; 2d segment broadest, as long as the 1st; 3d shorter, less rugulose; protruding apex of the 4th smooth and shining; 5th invisible. Coxæ and trochanters pallid; hind coxæ long and stout.

Wings hyaline, stigma and nervures fuscous; cubitus and anal nervure not decolorous as in *Sigalphus*.

The description of the ♀ is from Haliday. The ♂ I captured in a wood near King's Teignton, S. Devon. Reinhard, after kindly examining this specimen, returned it with the MS. name *pallidus*, adding that the same species occurred near Dresden. After careful examination I cannot find any difference between this and *lepidus*, Hal., and I conclude them to be identical. The types of *lepidus* were discovered by Curtis.

ii. SIGALPHUS, *Latr.*

Latr., H. N., iii., 327; Wesm., Nouv. Mém. Ac. Brux., 1835, p. 207.

Head less transverse, suborbicular. Prothorax inconspicuous; metathorax hardly bituberculate. Abdomen short, ovate, convex, rimulose (except at the apex); segment 1 transverse, imperfectly bicarinated; segment 2 shorter than 3; the remaining segments concealed under the carapace. Radial areolet not much larger than the stigma, ovate, acuminate, remote from the apex of the wing; cubitus and anal nervure decolorous; axillary areolet without an additional transverse nervure. Terebra elongate.

The small black species of this genus are parasites of *Curculionidæ* and Lepidoptera, and may be taken plentifully on umbellate flowers. Some of the males are not easily distinguished from each other, as is notably the case with *floricola* and *caudatus*. A difficulty also occurs in determining whether any particular insect belongs to this genus or *Calyptus*. In Förster's synopsis the two are widely separated under different rubrics, thus:—

9. Segments 1—3 exarticulate, connate .. SIGALPHUS.
11. Segments 1—3 articulated in the usual way .. .. CALYPTUS (*Brachistes*).

But as this character is recondite, and, however true, contrary to appearances, it may be useful to add the distinction pointed out by Reinhard. On inspecting the under side of *Sigalphus*, the belly is found to be concave from the base to the apex, its margins forming a sharply defined edge, and not reflexed; in *Calyptus* only the 1st segment (and, in the ♂, the base of the 2d) is acutely margined; the edges of the rest are reflexed, so as partially to cover the ventral surface. Both Nees and Ratzeburg have confused these genera; the former by regarding *Calyptus fasciatus* as a *Sigalphus*, the latter by describing *S. pallidipes* under the name of *Brachistes* (*Calyptus*) *fagi*.

TABLE OF SPECIES.

(2)	1.	Thorax rufous	8. *thoracicus*, Cur.
(1)	2.	Thorax black.	
(4)	3.	Both sutures of the carapace obsolete ..	7. *ambiguus*, Nees.
(3)	4.	One or two sutures distinct.	
(6)	5.	Palpi testaceous	5. *pallidipes*, Nees.
(5)	6.	Palpi black, or blackish.	
(10)	7.	Larger species, more than 1 lin., sometimes 1½ lin. long.	
(9)	8.	Abdomen ovate, subdepressed, not wider behind; terebra ♀ as long as the body	3. *striatulus*, Nees.
(8)	9.	Abdomen subglobose, convex, widest behind; terebra ♀ shorter than the body	6. *luteipes*, Thoms.
(7)	10.	Smaller species, 1 lin. long, or less.	
(12)	11.	Abdomen widest behind, obtuse	4. *obscurellus*, Nees.
(11)	12.	Abdomen widest in the middle, attenuated behind.	
(14)	13.	Terebra ♀ longer than the body ..	1. *caudatus*, Nees.
(13)	14.	Terebra ♀ much shorter than the body	2. *floricola*, Wesm.

1. *Sigalphus caudatus*, Nees.

Sigalphus caudatus, Nees, Mon., i., 268; Wesm., Nouv. Mém. Ac. Brux., 1835, p. 210; Ratz., Ichn. d. Forst., ii., 25; iii., 26; Cur., Farm. Ins., pp. 239, 244, pl. H., frontisp., f. 20, and pl. xxxv., f. 15, ♂ ♀; Thoms., Opusc. Ent., vi., 1874, p. 561.

Triaspis caudatus, Hal., Ent. Mag., iii., 126, ♂ ♀ (excl. var.).

Black, shining, legs piceous, tibiæ rufescent; antennæ ♀ shorter than the body, 19—23-jointed, those of the ♂ somewhat longer than the body, 20—24-jointed; abdominal carapace tripartite, segments 1—2, and often 3 at the base and sides, rimulose; segment 3 of the ♂ more shining. Terebra ♀ longer than the body. Stigma black. Length, ⅔—1; wings, 1½—2¼ lin.

Mandibles rufescent; palpi piceous. Mesothoracic sutures finely punctulate; metathorax uneven, sometimes irregularly carinated, punctulate. Abdomen ovate; 3d segment of the ♀ subrimulose, of the ♂ smooth and shining. Legs piceous, coxæ black; fore femora at the apex, and tibiæ, rufescent; middle and hind tibiæ at the apex, and tarsi, fuscous. The femora of the ♀ are a little stouter than those of the ♂. Wings hyaline, stigma black; according to Ratzeburg, the stigma of the ♀ is testaceous, but this must have been some accidental peculiarity, perhaps in an immature specimen. There are other trifling discrepancies in the descriptions of authors, but the species is distinct from all others by the length of the terebra in the ♀. The ♂ appears not to differ from that of the following species, and Wesmael remarks that had it not been for the difference of the terebra, he should have united his *floricola* with *caudatus*.

Reared from *Orchestes quercus*, L., which mines in oak-leaves, by Nördlinger at Grand Jouan, in Brittany. On June 6th, at Neustadt Eberswalde, Ratzeburg found the cocoons in the blisters formed upon oak-leaves by that Curculio. These cocoons are brown, 1 line long, and semitransparent, resembling in miniature those of the *Tachinidæ*, minus the spiracles. A similar cocoon was found by Reissig in oak-leaves rolled up by the larva of *Halias quercana*, Hüb. Curtis bred several females from the stems of barley containing the pupæ of *Oscinis vastator*, Cur. S. v. Vollenhoven assigns a different origin to this insect, regarding it as a parasite of *Tortrix hypericana*, Snell., perhaps erroneously.

2. *Sigalphus floricola*, Wesm.

Triaspis obscurellus, Hal., Ent. Mag., iii., 126, ♂ ♀; Thoms., Opusc. Ent., vi., 1874, p. 562 (nec Nees).
Sigalphus floricola, Wesm., Nouv. Mém. Ac. Brux., 1835, p. 208, ♂ ♀.

Very like the preceding. Legs black, fore femora at the apex, fore tibiæ, middle and hind tibiæ at the base, rufescent. Antennæ ♀ 19—21-, ♂ 20—22-jointed. Terebra ♀ not longer than the abdomen. Length, ⅔; wings, 1½ lin.

The length of the terebra is the only tangible difference between this and *caudatus*; the males seem absolutely identical. The average size of *floricola* is somewhat less, and the antennæ appear a trifle shorter. In adjusting the synonymy I have been guided by the following considerations:— 1. Haliday and Wesmael certainly had in view the same species, being the one that so closely resembles *caudatus*. 2. Both writers are of well-known accuracy, yet here we find them at variance, Haliday considering the species to be *obscurellus*, Nees, and Wesmael regarding it as undescribed. The question is, which of the two is mistaken. 3. *S. obscurellus*, as described by Nees, is distinct enough from *caudatus*, and from the present insect (*cf.* Wesm., *lib. cit.*, p. 210). 4. A common species is found in England which corresponds with *obscurellus*, Nees, and not of Haliday. I have 11 specimens, and, if Haliday's preoccupation of the name *obscurellus* were correct, these would have to be renamed as new. Hence it follows that the mistake is on the side of Haliday, not Wesmael. This conclusion clears up the difficulty; and it is further strengthened by the fact that Curtis (Guide, 2d ed., p. 120) gives *obscurellus*, Nees (by which *he* meant *obscurellus*, Hal.) as a synonym of *floricola*.

Common, like the preceding. Abundant in Ireland on sandy shores, according to Haliday. I have taken it in Birch Wood, Kent; and also in Leicestershire. Brischke states it to have been bred from beetle-larvæ, and in his Wirths-Tabelle gives it as a parasite of *Selandria adumbrata*, Kl.

3. *Sigalphus striatulus*, Nees.

Sigalphus striatulus, Nees, Mag. Ges. Berl., 1816, p. 249; Mon., i., 268, ♂ ♀; Ratz., Ichn. d. Forst., ii., 26, ♀; not of Thoms., Opusc. Ent., vi., 1874, p. 560 (terebra much shorter than the body).

Black; legs piceo-rufous, coxæ, trochanters, femora above, tibiæ except at the base, and tarsi, fuscous; antennæ 27—29-jointed; carapace tripartite, segments 1—3 rimulose, the 3d more faintly; terebra ♀ as long as the body. Length, 1½; wings, 3⅓ lin.

Abdomen ♀ somewhat shorter than the thorax, rimulose, the lines of sculpture fainter on the 3d segment, in the shining medial line of which they are reduced to punctures. Metathorax rugulose, without carinæ. The legs, as in the other species, vary in being lighter or darker. In the ♂ the abdomen is as long as the thorax, and the 3d segment more shining. Resembling *caudatus* in habit, but larger, with shorter terebra, the 3d segment more rimulose, and the antennæ attaining the maximum of joints for the genus.

Not before noticed as British. Supposed by Ratzeburg to be a parasite of *Pissodes notatus*, Fab. I have one specimen, a ♂ with 27-jointed antennæ, taken on the banks of the Usk, near Abergavenny. Another ♂ which I captured at Barnstaple has the sutures subobsolete.

4. *Sigalphus obscurellus*, Nees. (Pl. IV., fig. 5).

Sigalphus obscurellus, Nees, Mag. Ges. Berl., 1816, p. 252; Mon., i., 270, ♂ ♀ (nec Hal., Thoms.).

Less intensely black than *caudatus*; legs piceous, fore tibiæ entirely, and the others at the base more or less, rufescent or testaceous; antennæ ♀ shorter than the body, 22—23-jointed, those of the ♂ somewhat longer than the body, 23—25-jointed; mouth entirely black; carapace tripartite, segments 1—3 rimulose; segment 3 of the ♂ sometimes more faintly, but hardly shining. Stigma black. Terebra ♀ somewhat decurved at the apex, as long as the abdomen, or sometimes a little shorter. Length, 1—1¼; wings, 2½—3 lin.

This species has a different habit from *caudatus* and *floricola*, more easily seen than described. It is of a duller black, broader in proportion, if not longer; the abdomen is more convex, the rimulosity of the 3d segment coarser and more constant; even in the ♂ that segment cannot be called shining, more commonly it is as much sculptured as the two preceding; the mandibles, palpi, and stigma are black, or nearly so. Nees says that the 3d segment of the ♂ is more rimulose than that of the ♀, and he gives as a var. a ♂ with that segment nearly smooth; examples of both are among those before me.

Six males and five females were bred, on Sept. 9th, from *Gymnetron noctis*, Hbst., on toadflax, by Bignell; and several of both sexes by Billups on March 16th—19th from the cabbage-galls formed by *Ceuthorrhynchus sulcicollis*, Gyl. Cornelius bred *S. flavipalpis*, Wesm., from *Gymnetron antirrhini*, Germ. (Stett. Zeit., 1863, p. 117).

5. *Sigalphus pallidipes*, Nees.

Sigalphus pallipes, Nees, Mag. Ges. Berl., 1816, p. 251, pl. vii., f. 2; Mon., i., 270; Cur., Farm. Ins., 364; ♂ ♀.

Triaspis fulvipes (Cur.) Hal., Ent. Mag., iii., 127, ♂ ♀; *Sigalphus fulvipes*, Ratz., Ichn. d. Forst., ii., 26, ♀.

Brachistes fagi, Ratz., *lib. cit.*, iii., 28, ♂ ♀.

Black, pubescent, legs rufous; antennæ of the ♀ 23-jointed, as long as the body, stout; of the ♂ 22-jointed, longer; abdomen short, ovate, dilated behind, anus obtuse; carapace subbipartite, the 2d suture more or less obsolete; segments 1—3 (or 1—2, and 3 at the sides more or less) finely rimulose; terebra as long as the body. Length, ¾—1; wings, 2—2½ lin.

The 2d suture is often indistinguishable, which, with the rufous legs, may assist in separating this from the four preceding species. Palpi testaceous. Legs sometimes with a narrow fuscous streak on the femora, or the hind tibiæ tipped with fuscous; coxæ black. It resembles sp. 6 in habit, but *luteipes* is larger, with three segments distinct, and a shorter terebra.

An abundant insect in England, according to Curtis. A ♀ was taken from a cell of *Bruchus granarius*, L., in Russian beans. Subsequently he detected numbers in the long-pod beans from his own garden. It is also a parasite of *Orchestes semirufus*, Gyll., which mines in birch-leaves; reared by Nördlinger at Grand Jouan. Brischke obtained both sexes at the beginning of June from *Orchestes fagi*, L., feeding on the beech.

6. *Sigalphus luteipes*, Thoms.

? *Sigalphus aciculatus*, Ratz., Ichn. d. Forst., ii., 26; iii., 26, ♂ ♀, pl. ii., f. 2 (wing and abdomen).
S. luteipes, Thoms., Opusc. Ent., vi., 1874, p. 561.

The largest British species. Black, with rufous palpi and legs; antennæ ♂ 25—26-, ♀ 23—26-jointed; abdomen ovate, very convex, not dilated behind; carapace tripartite, segments 1—2 rimulose, 3 punctulate, hardly shining, sometimes rimulose at the sides; radius subsinuated; terebra somewhat longer than the abdomen. Length, 1½; wings, 3¼ lin.

This is most likely to be Thomson's species, though his description is too short. That of Ratzeburg applies very well, but, as the length of the terebra does not correspond, I have left a query before the name. The following is a summary of his description:—"Terebra ½ the length of the abdomen. Segments 1—2 entirely rimulose, as well as the base and sides of the 3d, which is nevertheless shining. Antennæ ♂ 25-jointed. Recurrent nervure ending 2½ times its own breadth before the end of the 1st cubital areolet. Stigma and squamulæ fuscous. Antennæ black. Tarsi obscure; in the ♀ brownish. Legs reddish; coxæ, trochanters, femora at the base and on the upper edge, and hind tibiæ at the apex, black. Metathorax with a carina bifurcated before the middle smooth before the bifurcation, afterwards rugulose." In another place (iii., 26) he notices a ♂

with 26-jointed antennæ. In three females I find the antennæ 23-, in another 26-jointed; but the antennæ of *Sigalphus* are variable in the same species. *S. flavipalpis*, Wesm., is out of the question, because that writer says that it so much resembles his *floricola* as perhaps to be only a variety.

I have before me five females and one male. Two females were taken by Walker, and two by myself at Sandwich; the remaining male and female were sent by Fitch. Ratzeburg's *S. aciculatus* was bred in both sexes from *Ochina hederæ*, Müll., by Nördlinger at Grand Jouan, in Brittany; and again by Jacobi at Nordhausen, from *Anobium rufipes*, F., nesting in the decayed branch of a plum-tree.

7. *Sigalphus ambiguus*, Nees.

Sigalphus ambiguus, Nees, Mag. Ges. Berl., 1816, p. 253; Mon., i., 272, ♂ ♀; Hal., Ent. Mag., iii., 128, ♂; Wesm., Nouv. Mém. Ac. Brux., 1835, p. 212, ♂ ♀; Thoms., Opusc. Ent., vi., 1874, p. 562.

Black, pubescent, legs rufous; antennæ ♂ 22—24-, of the ♀ 22-jointed; abdomen convex, rimulose, the carapace undivided; anus in the ♀ emarginate, terebra shorter than the abdomen. Length, 1¼—1½ lin.

Male. Black, hardly shining, pubescent, thinly punctulate; antennæ attenuated at the apex; thorax short, anteriorly gibbous; mesothoracic sutures broadly and thickly punctate, the intermediate lobe longitudinally depressed; metathorax very short, apical angles acutely elevated; abdomen very short, obovate convex, entirely and thickly rimulose, dull, posteriorly with an obsolete smooth longitudinal line, obtusely bicarinated at the base; sutures almost wholly obliterated, as in *Chelonus*; legs short, coxæ fuscous; hind legs stouter, tibiæ at the apex, and tarsi, darker; wings hyaline, stigma large, ovate, fuscous, the nervures paler; radial areolet larger than in *S. caudatus* and the kindred species. According to Nees, the legs are sometimes fuscous, the fore femora at the apex, their tibiæ entirely, and the posterior tibiæ at the base, rufous.

Var. Smaller; antennæ 20-jointed; colour of the legs fuscous, &c.; nervures pale.—Nees.

I have not seen this species; the description is taken from Haliday, who found two males in Ireland. Wesmael's male, taken near Brussels, had black trochanters and 21-jointed antennæ.

8. *Sigalphus thoracicus*, Cur.

Sigalphus thoracicus, Cur., Farm. Ins., 365.

"Similar in size and form to *S. pallipes*, but the thorax is of a red colour: all the legs are bright ochreous, the feet tipped with fuscous: the head was broken off and lost."

A ♀ was obtained by Curtis from Sicilian beans. In Ruthe's collection is a specimen of a *Sigalphus* with the thorax red, ticketed "*S. thoracicus*." Nothing more appears to be known of this species.

X. CHELONIDES.

Clypeus entire, mouth closed. Maxillary palpi 6-, labial 4-jointed. Occiput margined. Abdomen sessile; segments 1—3 united by coalition, without visible sutures, rarely with two superficial sutures; two other segments concealed, or the 4th rarely subexserted. Three cubital areolets; recurrent nervure interstitial or rejected; radial areolet small, remote from the apex of the wing, triangular, rarely ovate or lanceolate; pobrachial areolet longer, rarely shorter, than the præbrachial. Terebra concealed or exserted.

The typical *Chelonus* and its subdivision *Ascogaster* form a small natural group, sharply distinguished from every other by their uniformly rugose surface, and the undivided carapace of the abdomen. They have been found, with few modifications of structure, in every quarter of the globe. *Phanerotoma* and *Sphæropyx* are aberrant genera, with few species, having the carapace superficially tripartite. The former genus stands nearer to *Sigalphus*; the latter to *Agathis* and *Microgaster*. The *Chelonides* are parasites of Lepidoptera, chiefly, as it appears, of the *Tortricidæ*; less frequently of Coleoptera.

Table of Genera.

(4) 1. Abdomen above showing three segments; lateral margins not reflexed beneath.

(3) 2. Abdomen beneath simple, edentate; intermediate tibiæ externally gibbous .. .. i. PHANEROTOMA.

(2) 3. Abdomen beneath with two teeth, pointing backwards; intermediate tibiæ simple .. iv. SPHÆROPYX.

(1) 4. Abdomen above not divided into segments; lateral margins reflexed beneath.

(6) 5. Eyes hairy; first cubital areolet not separated from the prædiscoidal .. .. ii. CHELONUS.

(5) 6. Eyes naked; first cubital areolet separated from the prædiscoidal .. .. iii. ASCOGASTER.

i. PHANEROTOMA, *Wesm.*

Wesm., Nouv. Mém. Ac. Brux., 1838, p. 165.

Eyes naked. Abdomen superficially divided into 3 segments; lateral margins not reflexed beneath. Intermediate tibiæ externally gibbous. First cubital areolet distinct from the prædiscoidal; pobrachial shorter than the præbrachial; recurrent nervure subobsolete. Terebra (in the European* species) subexserted.

1. *Phanerotoma dentata*, Panz. (Pl. IV., fig. 6).

Chelonus dentatus, Panz., F. G., lxxxviii., 14; Krit. Revis., ii., 100.
Sigalphus dentator, Nees, Mag. Ges. Berl., 1816, p. 257, p. viii., f. 2, *a*, *b*.
Chelonus dentator, Nees, Mon., i., 279, ♂ ♀.
Ascogaster dentatus, Wesm., Nouv. Mém. Ac. Brux., 1835, p. 244; *cf. lib. cit.*, 1838, p. 165, ♂ ♀.
Sigalphus rufescens, Latr., Gen. Crust. et Ins., iv., 13.
Phanerotoma dentatus, Thoms., Opusc. Ent., vi., 1874, p. 582.

Finely rugulose, abdomen striolated. Head rufo-testaceous, eyes and stemmaticum dusky; thorax and abdomen variable, usually testaceous with the metathorax and 3d abdominal segment fuscescent; legs testaceous, often with the hind femora at the apex, together with a ring before the base, and all the tarsi, fuscous. ♂ ♀. Length, 2¼; wings, 4½ lin.

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* The following exotic species has never been described. It is remarkable for having the terebra more exserted than usual in this subfamily:—

Phanerotoma noctivaga, n. s.

Testacea, coriacea, oculis (in viva) viridibus; antennarum apice, metathoracis litura, abdomine postice, plerumque segmentorum primi et secundi limbo, tibiisque posticis apice, fuscescentibus; feminæ segmento anali emarginato; alis hyalinis, stigmate pallido vel fusco-maculato, terebra abdomine breviore, tenuissima, falcata. ♂ ♀. Long. 1—1¾; alar. exp. 2—3½ linearum.

Antennæ in both sexes 22-jointed, of the ♀, as long as the body, of the ♂, longer. Head wider than the thorax, transverse; vertex flat; clypeus entire, obtusely rounded, discrete, with two impressions at the base. Body very finely rugulose, almost coriaceous; abdomen very finely rimulose, constructed like that of *P. dentata*; the gibbosity before the apex, marking the limit of the 3d segment, more conspicuous in the ♂. Terebra as long as ⅔ of the abdomen, curved upwards, very slender and whitish, the valves at the apex fuscescent. Legs nearly white, only the tips of the hind tibiæ fuscescent; hind femora and tibiæ incrassated; intermediate tibiæ gibbous on their outer edge before the base.

Frequent in the Island of Antigua, flying by night. I took three males and three females at different times, attracted into the house by lamps, and saw many more.

Eyes during life of a fine green colour. Antennæ as long as the body, fuscous towards the apex, 23-jointed. Head subcubical, pubescent; face carinated. Metathorax with an abbreviated medial transverse carina. Abdomen subdepressed, segments 1—2 transverse, rimulose, the 1st with two basal carinæ, converging and vanishing before the middle; the 3d longer than broad, more finely rimulose, truncate at the apex, and with a gibbosity just before the truncature, indicating the posterior limit of the segment; both the sutures crenulate. Wings slightly fuscescent, nervures and stigma brownish, the latter pale at the base; before and behind it is a decolorous streak; 2d cubital areolet much attenuated outwardly; radial areolet approaching the apex of the wing. In the hind wing the radial areolet is constricted in the middle, where an imperfect transverse nervelet almost joins the costa.

Var. *α*. Fusco-ferruginous, uniform, orbits and legs paler; hind tibiæ more broadly fuscous; wings without hyaline streaks.

Var. *β*. Ferruginous, disk of the mesothorax fuscous with a pale patch anteriorly bifid; abdomen fuscous, segment 1, and 2 at the base, more or less pale.

Var. *γ*. The same, but the vertex and pectus are also fuscescent.

Var. *δ*. Thorax and abdomen entirely fuscous.

In the darker varieties the hyaline streaks on the wings are more distinct, the orbits are rufous, and the hind tibiæ more highly coloured.

Not uncommon in Southern and Central Europe. I have a specimen which I took in Corsica. Rare in England, but one was captured by Dale in Stilton Fen, Huntingdonshire, August 14th, as recorded by Curtis, B. E., 672. Another was in Walker's collection. Several were taken at Dover by Sydney Webb, in a warehouse, in August, and conjectured by him, with great probability, to be parasites of *Myeloïs ceratoniæ*, Zell., occurring in the same warehouse. A specimen has also been captured by Billups. Obtained by Reissig from a *Tortrix* larva living on the oak; by Brischke out of *Rhodophæa advenella*, Zinck., from Silesia.

ii. Chelonus, *Jur.*

Jur., Hym., 289 (1807); Nees, Mon., i., 288, Sect. IV.; Wesm., Nouv. Mém. Ac. Brux., 1835, p. 214.

Eyes naked. Abdomen above with no visible sutures; lateral margins reflexed beneath. Intermediate tibiæ simple. First cubital areolet not separated from the prædiscoidal; pobrachial shorter than the præbrachial; recurrent nervure interstitial. Terebra concealed or subexserted.

The species are of stout subcylindrical form, with hard integuments, covered with rugosity irregularly disposed in striæ or reticulated, and mixed with coarse punctures. They are black, frequently with a pair of testaceous spots, round or triangular, occupying the region of the spiracles of the 1st abdominal segment, and sometimes confluent. In *C. Wesmaelii*, Cur., the abdomen is broadly rufous above. The legs are rufo-testaceous, usually diversified with black. *C. pullatus*, Dahlb. (Sv. Ak. Handl., 1838, p. 163) is described as wanting the 2d cubital areolet, and seems therefore to belong to some other genus.

The abdomen, viewed from above, generally shows no vestige of sutures; but one or two are sometimes indicated by slight transverse depressions. On the under side it has the appearance of being eviscerated; the reflexed edges surround an oblong cavity, against the walls of which the belly is flattened after death by shrinking. The sutures of the ventral surface are always more or less visible; in the male at least five segments may be counted, showing that the shield is compounded of more than the first three segments. The sexual distinctions are best seen on the under side; the terebra originates just behind the middle of the abdomen, and is either falcate or straight; in the former case it curves upwards in a reverse direction to the contour of the abdomen. The valvula ventralis is distinct, contained within the shell in repose, but capable of being moved downwards and backwards so as to allow the terebra to pass the reflexed apical edge, in which a shallow groove is often cut for its reception. Many of the males exhibit a variously-shaped fissure at the apex of the abdomen, in the centre of which may be discerned the sheath of the generative organ, sometimes mistaken for the terebra, and the cause of confusion of sexes in the descriptions. In most cases the antennæ are also a guide to the determination of the sexes; those of the male are longer, setaceous, or tapering gradually to the extremity, while in the female they are shorter, compresso-dilated beyond the middle, and thence somewhat abruptly diminishing to the apex. The absence of a valvula ventralis will also serve to distinguish the males.

Uniformity of structure and colour makes the species difficult to separate by the eye, and still more so to describe. Their nomenclature is in the greatest disorder, so that without types it is often impossible to say what species are intended by authors. The earliest attempt at a monograph of the genus is that by Nees von Esenbeck (Mag. Ges. Berl., 1816, pp. 265—274), containing 13 species. Dahlbom followed (Sv. Ak. Handl., 1833, pp. 159—163) with 5, of which only one bears the same name as a species of Nees. In the next year Nees (Mon., i., pp. 288—298) republished his 13 species without taking notice of Dahlbom's work. Wesmael (Nouv. Mém. Ac. Brux., 1835, pp. 214—225, and 1837, Suppl. pp. 156—163), also unacquainted with Dahlbom's paper, published 12, of which only 6 bear the same names as those of Nees, some of them doubtfully. His descriptions, and those of Nees, are the chief sources of information, although the same species is sometimes given more than once, and in several cases the male is mistaken for the female. In 1867 Reinhard (Berl. ent. Zeit., pp. 358—360) adjusted the synonymy of *C. sulcatus*, Nees, and *eurytheca*, Wesm., with the addition of two new species. And in 1874 Thomson (Opusc. Ent., vi., pp. 563—581) published 27 species, 18 with new names. My coadjutor Fitch and myself have been disappointed in our efforts to gain information from this paper. To the above-mentioned works are to be added a few descriptions by Herrich-Schäffer (F. G., cliii, cliv), and Curtis (B. E., dclxxii).

TABLE OF SPECIES.

MALES.

(16) 1. Abdomen without an apical fissure.

(3) 2. Abdomen broadly rufous above, the apex and a medial line black .. .. 3. *Wesmaelii*, Cur.

(2) 3. Abdomen entirely black, or with 2 yellowish basal spots, sometimes confluent.

(13) 4. Third abscissa of the radius of the fore wing curved, concave exteriorly; radius of the hind wing (in addition to its basal flexure) curved in the middle.

(10) 5. Squamulæ black, or blackish.

(7) 6. Hind tibiæ rufous, generally tipped with black, but not black or annulated with darker colour at the base; 1st joint of the hind tarsi broadly rufous at the base. Length, 2½ lines; largest sp. 1. *inanitus*, L.

(6) 7. Hind tibiæ black or blackish at both ends (the base often only annulated with fuscous), rufous in the middle; 1st joint of the hind tarsi wholly fuscous. Length, 1½, seldom 2 lines; middle-sized spp.

(9) 8. Antennæ more than 30-jointed; frontal fovea smooth, shining, deep, geminated by a carina .. .. .. 4. *carbonator*, n. s.

(8) 9. Antennæ 27-jointed; frontal fovea rugulose, dull, nearly obsolete, not geminated or carinated .. .. .. 6. *corvulus*, n. s.

(5) 10. Squamulæ testaceous.

(12) 11. Face not remarkably pubescent .. 8. *dispar*, n. s.

(11) 12. Face almost concealed by dense whitish pubescence .. .. 9. *canescens*, Wesm.

(4) 13. Third abscissa of the radius of the fore wing straight; radius of the hind wing (after its basal flexure) straight or nearly so.

(15) 14. Antennæ 32-jointed, much longer than the body; length, 1½ lin. .. .. 10. *catulus*, n. s.

(14) 15. Antennæ 23-jointed, not longer than the body; length, 1⅓ lin. .. .. 11. *pusio*, n. s.

(1) 16. Abdomen furnished with an apical fissure.

(18) 17. Apical fissure 10 times broader than long, its shining edges produced along each side of the abdomen .. .. 12. *risorius*, Reinh.

(17) 18. Apical fissure not so much broader than long, not produced along the sides of the abdomen, ovate, reniform, or suborbicular; small spp.

(20) 19. Prothorax much produced, forming a distinct neck .. .. 13. *secutor*, n. s.

(19) 20. Prothorax as usual.

(22) 21. Antennæ 27—30-jointed .. .. 14. *parcicornis*, Schäff.

(21) 22. Antennæ 20—24-jointed.

(24) 23. Apical fissure about 3 times broader than long, reniform .. .. .. 15. *sulcatus*, Nees.

(23) 24. Apical fissure subcircular.

(26) 25. Head transverse; cheeks not dilated .. 16. *latrunculus*, n. s.

(25) 26. Head subcubical; cheeks dilated .. 17. *exilis*, n. s.

FEMALES.

(14) 1. Antennæ with more than 16 joints.

(7) 2. Hind tibiæ rufous, generally tipped with black, but not black or annulated with darker colour at the base; 1st joint of the hind tarsi broadly rufous at the base. Length, 2½ lines; largest spp.

(6) 3. Costa and parastigma fuscous; antennæ shorter than the body; frontal fovea not shining, rugose like the rest of the head.

(5) 4. Antennæ compresso-dilated beyond the middle, suddenly attenuated near the apex .. .. 1. *inanitus*, L.

(4) 5. Antennæ setaceous, gradually diminishing to the apex .. .. .. 2. *submuticus*, Wesm.

(3) 6. Costa and parastigma testaceous; antennæ as long as the body (setaceous); frontal fovea shining, smooth .. 5. *speculator*, n. s.

(2) 7. Hind tibiæ black or blackish at both ends (the base often only annulated with fuscous), rufous in the middle; 1st joint of the hind tarsi wholly fuscous. Length, 1½, seldom 2 lines; middle-sized spp.

(9) 8. Antennæ 18-jointed .. .. .. 9. *canescens*, Wesm.

(8) 9. Antennæ with more than 18 joints.

(11) 10. Frontal fovea subobsolete, dull and rugulose like the rest of the head .. 6. *corvulus*, n. s.

(10) 11. Frontal fovea conspicuous, smooth and shining.

(13) 12. Hind tibiæ broadly rufous in the middle, blackish at both ends; tarsi rufous at the base .. .. 7. *decorus*, n. s.

(12) 13. Hind tibiæ black, with a narrow rufescent ring; tarsi wholly blackish .. 4. *carbonator*, n. s.

(1) 14. Antennæ 16-jointed.

(16) 15. Squamulæ testaceous .. .. .. 8. *dispar*, n. s.

(15) 16. Squamulæ black. Small species.

(18) 17. Base of the abdomen determinately yellowish .. .. 18. *basalis*, Cur.

(17) 18. Abdomen entirely black.

(20) 19. All the femora rufo-testaceous .. 16. *latrunculus*, n. s.

(19) 20. Femora black, except at the apex.

(24) 21. Head transverse, contracted behind the eyes; cheeks not dilated.

(23) 22. Apex of the abdomen beneath with a shallow groove to receive the point of the terebra .. .. 14. *parcicornis*, Schäff.

(22) 23. Apex of the abdomen not so grooved .. 15. *sulcatus*, Nees.

(21) 24. Head subcubical, not contracted behind the eyes; cheeks dilated .. .. 17. *exilis*. n. s.

1. *Chelonus inanitus*,[*] L.

Cynips inanita, Lin., S. N., ii., 917, ♀.
Chelonus inanitus, Nees, Mon., i., 289; Wesm., Nouv. Mém. Ac. Brux., 1835, p. 217, ♂ ♀; *C. inanitor*, Thoms., Opusc. Ent., vi., 1874, p. 566, ♂ ♀.
C. oculator, Dahlb., Sv. Ak. Handl., 1832, p. 159, pl. iv., f. 14 (♀ with details); Wesm., *lib. cit.*, p. 216, pl. ii. (wing); Thoms., Opusc. Ent., vi., 1874, p. 564, ♂ ♀; (*C. oculatus*, Nees, Mon., i., 290, and all other synonyms and varieties, are doubtful).

Black; palpi black; mandibles rufescent at the tips; abdomen with or without 2 basal yellowish rounded spots; legs rufo-testaceous, coxæ, trochanters, femora at the base more or less, and 4 posterior tibiæ at the apex sometimes, black; tarsi fuscous, black at the tips, the 1st joint flavo-testaceous with the apex fuscous; spurs pale. Wings fumato-hyaline, nearly limpid at the base; a curved whitish streak under the stigma, which together with the outer nervures is dark fuscous; costa and parastigma fusco-testaceous; præbrachial and other basal nervures of all the wings testaceous; squamulæ black; 3d abscissa of the radius of the fore wings curved, concave outwardly; radius of the hind wings sinuated. Body coarsely rugose, somewhat shining, beset with short, scattered, pale hairs. Head reticulato-rugose, striato-rugose round the orbits and cheeks; vertex transverse, not widened behind the eyes, cheeks not dilated; clypeus bisinuated, elevated, shining, punctulate; frontal fovea rugose, hardly more shining than the rest of the head, geminated by a carina. Antennæ ♂* as long as the body, setaceous, 27—30- (usually 28-) jointed; of the ♀ shorter than the body, compresso-dilated beyond the middle, the last 5—6 joints rapidly decreasing in size, 23—24- (rarely 25-) jointed. Mesothorax reticulato-rugose, the reticulations coarser behind, and falling into irregular striæ before the scutellum. Scutellum smooth in the middle, except two or three faint striæ, reticulated and margined all round; the basal fovea cancellated. Metathorax short, transverse, truncated, reticulato-rugose, 4-denticulate. Abdomen ♂ depresso-cylindrical; viewed laterally, clavate; obtuse behind, rather longer than the head and thorax, the sides subparallel, very slightly sinuated near the basal tubercles; of the ♀ shorter, the sides somewhat curved, and the apex rounded; the base covered with coarse reticulations arranged in striæ, two of which are often more elevated, forming carinæ; the reticulations become shorter and finer posteriorly, so that the apex is more shining, and almost punctate. Terebra ♀ testaceous with black valves, falcate, concealed in repose, but capable of being protruded a little beyond the anus. ♂ ♀. Length, 2½; wings, 4½ lin.

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[*] *Chelonus Antillarum*, n. s.

C. inanito simillimus, niger, pubescens, opacus, scaber; antennis maris 30-, feminæ 26-articulatis; scutello medio læviusculo; metathorace bicarinato, subquadridentato; abdomine integro, ovali, antice flavo-bimaculato; pedibus sordide testaceis, sericeis, coxis trochanteribusque nigris, femoribus anticis basi, posterioribus fere totis, tibiis etiam posterioribus apice et ante basin, piceis; terebra recondita. ♂ ♀. Long. $2\frac{1}{2}$; alar. exp. $4\frac{1}{2}$ linearum.

Palpi pitchy, mandibles black, clypeus bearded with pale pubescence, which is also thinly scattered over the whole body. Metathorax acutely bidenticulate, and with several longitudinal carinæ, two of which are elevated at the apex; hence subquadridentate. Abdomen bicarinated and reticulato-rugose at the base, rugoso-punctate towards the apex, and glistening with hoary pubescence. The yellowish abdominal spots are triangular, and smaller than in the similar European species; in one female, obsolete. Wings hyaline towards the base, with decolorous nervures; dusky towards the apex, with fuscous stigma and neuration; cubitus and anal nervure attenuated outwardly and subobsolete; 3d abscissa of the radius not sinuated; radial areolet shorter and more obtuse than in *C. inanitus*.

Common in the West Indies; I found several of both sexes in Barbados, Martinique, and Antigua.

Described from 38 males and 29 females, mostly taken by myself at the same time and place in the Isle of Wight, and which are uniform in their characters, agreeing with Wesmael's *oculator* and *inanitus*. The yellowish abdominal spots are inconstant, appearing but seldom in the males, and only in a minority of the females; a specimen from Maldon has a spot on one side of the abdomen only.

Common throughout the country, and especially near the coast of the Isle of Wight at Niton, in July, where I took 46 in a few hours; 21 more specimens were sent me by Fitch, obtained by himself and Bridgman. Bignell has also captured many in Devonshire. A solitary parasite of Lepidoptera; two females were bred by Elisha, August 12th, from *Catoptria æmulana*, Schl.; in one of these the femora are more broadly black than usual, and the hind tibiæ are blackish at the base; the other exhibits no peculiarity. Specimens in Brischke's collection (named by Ruthe) were reared from *Miana literosa*, Haw., and *Tapinostola elymi*, Tr.

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* A ♂ taken by Bignell has the left antenna 28-, the right 27-jointed, both unusually short.

The synonymy of this species is embarrassing, and perhaps can never be quite cleared up. More species than one seem to be contained under the name *oculator* of authors, and it is useless now to enquire whether Fabricius, Olivier, Panzer, and Latreille had all the same insect in view. It appears, however, that Nees was right in regarding his own *C. oculatus* as distinct from *Cynips inanita*, L. *C. oculator*, Wesm., is identical with *Cynips inanita*, L., and different from *C. oculatus*, Nees. This conclusion, attained after much puzzling, obliges me to unite *Cynips inanita*, L., with *C. oculator*, Wesm., and to restore the Linnean name. The insect representing *Cynips inanita* in the Linnean cabinet has been carefully examined by Fitch, and there is every reason to believe it to be the common *C. oculator*, Wesm. It is a female with the terebra slightly exserted, which is nothing remarkable. The legs are rufous, only the hind tibiæ black at the apex. The Linnean diagnosis has the words "pedibus ferrugineis"; the further description adds "pedes ferruginei exceptis tibiis nigris," where "tibiis" is due to some inadvertence, or perhaps the word "apice" is omitted. Wesmael, delighting over much in subtleties, having erroneously assumed his own *oculator* to be the *oculatus*, Nees, was bound to follow that writer in regarding *inanitus*, Nees, as distinct. He endeavours to establish the distinctness of *inanitus* on two grounds only: (1) the terebra projects beyond the anus; (2) the abdomen seems a little broader, and somewhat more rounded at the sides and posteriorly. The first difference is merely due to the temporary position of the organ, and may happen in the case of any female *Chelonus*. The second is vague and inappreciable, when we consider that the individuals of a species are not cast in a mould. These differences moreover belong only to the females, no attempt being made to discriminate the males. There are several English specimens which will pass for *C. inanitus*, Wesm., ♀. I believe them to be nothing but fine examples of *oculator*, Wesm., having the abdominal spots, and killed at a time when the genital apparatus was in a state of tension. One such female was taken by Billups at Walmer; others by Sharp and Fitch; and by me at Niton, Isle of Wight.

For *C. oculatus*, Nees, Mon., i., 290, see *C. carbonator*, sp. 4, infra.

C. oculator, Thoms., Opusc. Ent., vi., 1874, p. 564, ♂ ♀, is placed in a section characterised by the deeply reflexed edges of the emarginations of the mesosternum which receive the fore coxæ. I have failed to discover this character in British specimens of any species. Moreover, the metathorax is described as "concinne minus fortiter punctatus," which is inapplicable to our species.

C. cylindrus, Nees, Mon., i., 291, ♂. Antennæ 29- (*i. e.*,* 28-) jointed. Perhaps the same as *C. oculator*, Wesm. Nees has taken great pains to show that it is not his *C. oculatus*.

C. scaber, Nees., Mon., i., 297, ♂ ♀, was regarded by the author as doubtfully distinct from his *oculatus*. Length, 2—2½ lin. Body stouter and more compact; abdomen shorter, more oval, without basal carinæ—which Nees declares to be never wanting in his *oculatus*, another proof of the diversity of that species from *oculator*, Wesm.—seldom with yellowish spots; femora black, only the fore pair rufous at the apex; tibiæ pale testaceous, not rufous, the middle pair always darker at the apex, generally fuscous with the base pale; wings darker than in *oculatus*; scutellum not smooth in the middle. Antennæ not described. (Compare *C. carbonator*, sp. 4, infra). This is said by Haliday and Curtis to be the same as *C. annulipes*, Wesm., which Wesmael himself expressly denies; by Thomson it is joined doubtfully to his *C. buccatus*, which is insufficiently described. *Ichneumon scabrator*, Fab., E. S., ii., 174, quoted by Nees as a synonym, is not now in the Banksian collection.

Ruthe in his collection distributed the specimens which stand under the name *C. oculatus*, Nees, into three varieties; (*a*) *rufipes* (*b*) *variipes*, and (*c*) *nigripes* = *scabrator*, Fab. But his views on the affinities of the *Cheloni* were unfortunately never published.

2. *Chelonus submuticus*, Wesm.

Chelonus submuticus, Wesm., Nouv. Mém. Ac. Brux., 1835, p. 218, ♂ ♀.

Similar to the preceding, but with different antennæ. Those of the ♀ are as long as ¾ of the body, 26-jointed (27- according to

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* As Nees reckons the radicle, it is necessary always to subtract 1 from his enumerations.

Wesmael), setaceous, not dilated and compressed beyond the middle, nor suddenly attenuated at the apex. The other differences are less obvious; abdomen broader, more obtuse behind, the apex subtruncate, channelled beneath to receive the point of the terebra; base with 2 small triangular yellowish spots not touching the reflexed edges, which are also yellowish for a short distance; 2 faint basal carinæ not reaching the pale spots. Metathorax strongly bidenticulate, and with 2 blunter lateral angulations. Terebra concealed. Wings as in the preceding species; costa, basal nervures, and parastigma testaceous, the latter with a fuscous spot. I have not seen the ♂, which, according to Wesmael, is like the ♀, and with similar antennæ, but 29—30-jointed. ♂ ♀. Length, 2½; wings, 4½ lin.

More robust than *C. inanitus*, L., and evidently distinct. The antennæ alone lead me to conclude that it is the real *submuticus*, Wesm., for the other characters given by him are not likely to be constant. The metathorax is more strongly bidenticulate than in Wesmael's description, and the basal carinæ of the abdomen more feeble; all the characters, however, are present. As the cheeks are not dilated, it cannot be *C. buccatus*, Thoms., which that writer compares, as to its antennæ and metathorax, with *submuticus*, Wesm.

One female is in Fitch's collection.

Bridgman captured, at Brundall, Norfolk, a ♂ closely resembling the above ♀, except that the antennæ are 25-jointed. It is no doubt a different species, which I am unable to name, or to describe intelligibly without more specimens, including the other sex.

3. *Chelonus Wesmaelii*, Cur.

Chelonus Wesmaelii, Cur., B. E., pl. dclxxii., ♂.

Black; palpi testaceous; abdomen bright rufo-testaceous above for ⅔ of its length, with a black medial stripe, sometimes interrupted; legs rufo-testaceous, coxæ and trochanters black, hind femora and tibiæ narrowly at the apex, and all the tarsi except their basal joint, fuscous. Wings fuscescent, longer and narrower than in the two preceding species, with a whitish streak beneath the attenuated stigma; radial areolet elongate, acuminate, the 3d abscissa almost straight; radius of the hind wings curved. Rugose, pubescent; antennæ ♂ as long as the body, 32—34-jointed. ♂. Length, 3; wings, 4¾ lin.

Size of *C. inanitus*, L., but more slender, with longer legs and less coarse rugosity. I have not seen the ♀, and the very old specimen of the ♂ which I possess does not admit of minute description; but the species cannot be mistaken. Antennæ 32-jointed, setaceous; according to Curtis 34-jointed. Metathorax bluntly bidenticulate. Abdomen somewhat wider behind, with a transverse depression indicating the 1st suture, at which place the black longitudinal stripe is interrupted in Curtis's specimen; in mine it is continuous, emitting a short branch on either side; the apex is impressed with a shallow triangular fovea.

This fine species is not noticed by the continental writers, and seems to have occurred only in England, where it must be very rare or local. The locality given by Curtis is Tollesbury, near Maldon, in Essex. My specimen is the gift of Walker, who possessed several, which are now in the Oxford Museum, numbered 334, as I am informed by the Professor of Zoology.

4. *Chelonus carbonator*, n. s.

Niger, abdomine immaculato; palpis nigricantibus; femoribus anticis præter apicem, mediorum apice ipso, tibiis anticis totis, posterioribus medio, ferrugineis, vel tibiis posticis nigris rufo-annulatis. Alæ anticæ infumatæ, in femina saturatius, posticæ magis hyalinæ; squamulæ nigræ; stigma cum costa nervisque exterioribus fuscum; parastigma et nervus præbrachialis testacea; areola radialis brevis, stigmate latior, abscissa 3tia curvata; alarum inferiorum radius sinuatus. Clypeus discretus, punctis ad basin duobus exiguis impressus; vertex transversus, pone oculos contractus, genis nequaquam dilatis; fovea frontalis nitida, profunda, geminata. Maris antennæ 33—34-, feminæ 28—33-articulatæ, crassiusculæ, apicem versus sensim decrescentes. Mesothorax antice fortiter punctatus, posterius striato-reticulatus. Metathorax brevis, valde transversus, 4-denticulatus, medio subcarinatus, reticulatus. Abdomen sculptura solita exasperatum, carinis basalibus nullis, maris apice integrum, obtusum, feminæ magis ovatum, terebra occulta.

Black, abdomen immaculate; palpi blackish; tips of mandibles, fore femora except the base, fore tibiæ entirely, intermediate femora at the extreme apex, ferruginous; 4 posterior tibiæ dull ferruginous, broadly blackish at the apex and annulated with fuscous near the base, or the hind tibiæ black with a subferruginous ring; tarsi blackish, the 4 anterior rufous at the base. Fore wings infumated, darker in the ♀, with a curved whitish streak behind the stigma; hind wings nearly hyaline; squamulæ black; stigma, costa, and nervures fuscous, only the parastigma and præbrachial nervure testaceous; radial areolet short, broader than the stigma; 3d abscissa of the radius curved; radius of the hind wings sinuated. Head and thorax rather shining, the former finely and irregularly rugulose, reticulated, partly striato-rugulose, beset with pale hairs, especially on the face, which is also tranversely striated; clypeus shining, densely punctulate, discrete, the punctiform basal foveæ very minute; vertex transverse, narrowed behind the eyes, cheeks not dilated; frontal fovea shining, deep, geminated. Antennæ ♂ as long as the body, 33—34-jointed; of the ♀ shorter, 28—33-jointed, incrassated for about ⅔ of their length, afterwards slightly and gradually decreasing. Mesothorax shining, uneven, with coarse irregular scattered punctures in front, striated and subreticulated towards the scutellum, which is shining and sparingly punctulate. Post-scutellum not dentiform. Metathorax short, very transverse, quadridenticulate, shining, coarsely reticulated, with traces of a medial carina. Abdomen dull, pubescent at the apex, as long as the head and thorax, without basal carinæ, depresso-cylindrical, reticulated and striato-rugose at the base, the striæ becoming shorter and finer posteriorly, leaving the apex punctulate and somewhat shining. Abdomen ♂ obtuse and imperforate at the apex; of the ♀ ovate, less bluntly rounded behind; terebra concealed. ♂ ♀. Length, 1¾—2; wings, 3—3½ lin.

Described from two males and two females. One pair was taken by Billups, the ♀ is ticketed "Margate." Bignell captured a ♂ in Devonshire, and the remaining ♀ is in Fitch's collection. A ♂ with 34-jointed antennæ is among some Andalusian insects brought by Sharp from the Sierra Nevada.

Having failed to clear up the obscurity surrounding *C. annulatus*, Nees, and *annulipes*, Wesm., I am forced to impose a new name, and probably to make a synonym, for which some excuse may perhaps be found in the following considerations:—

C. annulatus, Nees, ♂ (wrongly called ♀, and according to Reinhard = *fenestratus*, Nees, ♂) has 33- (*i.e.*, 32-) jointed antennæ, and is the only Neesian species to which this could be referred. The femora are rufous, the hind tibiæ black with a white ring, and the abdomen is bimaculated with yellow. It is also out of the question through being coupled by Reinhard with a ♀ whose antennæ are 16-jointed, viz., *fenestratus*, Nees. Of

Thomson's *annulatus* I can make nothing, except that, having the squamulæ "plerumque albidæ," it cannot be the present insect. Wesmael's *C. annulipes* ♂ (excluding the ♀, the variety, and the synonyms) has the mandibles black, the abdomen bimaculated, the middle tibiæ not annulated at the base, and the wings almost hyaline; the probability of its being the present species is further diminished by Reinhard's remark that *annulipes*, Wesm., ♂ = *sulcatus*, Nees, ♂, with 25- (*i.e.*, 24-) jointed antennæ. *C. scaber*, Nees, said by Haliday and Curtis to be *annulipes*, Wesm., has been already mentioned under sp. 1. It resembles the present insect in the colour of the hind tibiæ. Thomson's *annulipes* is described as having the cheeks dilated, the post-scutellum dentiform, the ♀ with 24-jointed antennæ, and is referred to *annulipes*, Wesm., doubtfully, without further explanation.

C. oculatus, Nees, Mon., i., 290, ♂ ♀ (excluding varieties) differs in the colour of the hind tibiæ, but is otherwise nearer to this species than to *C. inanitus*, L. Length, 2—3¼ lin. Antennæ ♂ 33- (*i.e.*, 32-) jointed, those of the ♀ not described. Scutellum smooth at the base, punctate broadly at the apex. Abdomen immaculate, or (in dubious varieties) spotted; always with 2 distinct basal carinæ. Hind tibiæ rufous tipped with black; tarsi fuscous, not testaceous at the base, but only on the under side of the 1st joint; femora black at the base, or entirely black. It will be seen that the size, the number of joints in the antennæ, and the colour of the tarsi, do not quadrate with our sp. 1., the numerous examples of which are constant in their characters.

Two doubtful specimens may here be noticed, which at present it would be useless to describe. A ♂ taken by Fitch, agreeing with *carbonator*, except in size (length, 2½ lines), and in the antennæ, which are 29-jointed. And a ♀ equally large, in too bad condition to describe, having the antennæ 25-jointed, and the hind tibiæ wholly black. The latter I captured in the New Forest.

5. *Chelonus speculator*, n. s.

Niger, abdominis basi bimaculata; palpis nigricantibus; pedibus testaceis; coxis, femorum anticorum basi, posterioribus præter apicem totis, tibiarum posticarum apice, nigris, harum basi fuscescente; tarsis fuscis, basi testaceis. Alæ infumatæ, tinctu ferrugineo, stigmate nervisque fuscis, parastigmate et nervis basalibus testaceis, squamulis piceis; abscissa 3tia curvata; alarum inferarum radio sinuato. Caput reticulatum, orbitis striolatis, fovea frontali rugulosa, nitida, genis paulo dilatatis. Feminæ antennæ 27-articulatæ, ultra medium incrassatæ, vix ad apicem sensim decrescentes, *C. inaniti* antennis multo longiores. Corporis rugæ subtiliores. Scutellum medio læve. Abdomen more solito scabratum, ellipticum, carinis basalibus nullis. Metathorax longior, subquadridentatus, fortius reticulatus. Mesosternum antice haud reflexum. Terebra occulta.

Black, with 2 large triangular yellowish spots at the base of the abdomen; palpi dusky; mandibles at the tip, and legs, testaceous; coxæ, fore femora at the base, 4 posterior wholly except the tips, and tips of the hind tibiæ, black; these last slightly fuscescent at the base, their tarsi blackish with the 1st joint testaceous; calcaria pale. Wings infumated, with a ferruginous tinge, and a darker stain underneath the fuscous stigma; parastigma and basal nervures testaceous, the rest fuscous; squamulæ pitchy; 3d abscissa of the radius curved; radius of the hind wings sinuated. Head reticulato-rugulose, orbits and cheeks striolated; frontal fovea deep, rugulose, shining; cheeks somewhat dilated. Antennæ ♀ 27-jointed, incrassated beyond the middle and only slightly attenuated towards the apex, hardly shorter than the body and much longer than those of *C. inanitus* ♀. Rugosity of the body finer and more variolose than in that species. Scutellum shining in the middle. Abdomen longer, not so obtuse behind, but regularly elliptical, without basal carinæ. Metathorax longer, subquadridentate, more coarsely reticulated. Anterior edge of the mesosternum not reflexed. Terebra concealed. ♀. Length, 2¼; wings, 4 lin.

When compared with the ♀ of *C. inanitus* this is very distinct; more elongate, the abdomen regularly elliptical, rounded behind instead of obtuse; the antennæ are ⅓ longer, stouter and less attenuated at the apex; the frontal fovea is smooth and shining; the wings are darker and more ferruginous; the radial areolet larger, the 2d cubital more produced inwardly, the parastigma and basal nervures paler, and the posterior femora differently coloured. It agrees with Thomson's description of *C. Gravenhorsti* (Opusc. Ent., vi., p. 573), but not with *C. Gravenhorstii*, *pellucens*, Nees, or *eurytheca*, Wesm., all which are cited by Thomson as synonyms. *C. eurytheca*, Wesm., is very different, and, according to Reinhard, is the ♂ of *parcicornis*, Schäff. (see sp. 14, infra). In any case a new name is here required.

I captured this ♀ on a strawberry-bed in my garden at Nunton, Wilts.

6. *Chelonus corvulus*, n. s.

Chelonus annulipes, var. 1, Wesm., Nouv. Mém. Ac. Brux., 1838, p. 162 (antennæ 26—29-jointed).

Black, abdomen immaculate; palpi and tips of the mandibles, fore femora at the apex broadly, the middle pair more narrowly, and all the tibiæ testaceous; hind tibiæ tipped with black and annulated with dusky near the base; tarsi fuscous, the 1st joint of the 4 posterior pale at the base; calcaria whitish. Wings infumated, stigma and nervures fuscous, parastigma and basal nervures subtestaceous; squamulæ piceous; 3d abscissa of the radius very slightly curved; radius of the hind wings sinuated. Reticulato-rugose, dull; head more finely sculptured, orbits and cheeks striolated; vertex transverse, contracted behind the eyes, cheeks not dilated; frontal fovea large, shallow, smoother than the rest of the head, geminated by a carina. Antennæ ♂ 27-jointed, longer than the body; of the ♀ 24—26-jointed, stouter, shorter, incrassated beyond the middle, and near the apex suddenly attenuated. Mesothorax coarsely reticulated, especially near the scutellum, slightly shining, with an obsolete medial raised line, the sides and scutellum more finely rugulose. Metathorax short, transverse, truncate, coarsely reticulated, bidentate, with 2 longitudinal carinæ diverging posteriorly and sometimes obsolete. Abdomen depresso-cylindrical, somewhat shorter than the head and thorax, covered with oblong subparallel reticulations, finer posteriorly, the apical third smoother and rather shining; at the base are 2 short carinæ, subobsolete and confused with the other striæ. Abdomen ♂ imperforate. Terebra ♀ concealed. ♂ ♀. Length, $1\frac{1}{2}-2$; wings, $2\frac{2}{3}$—$3\frac{1}{2}$ lin.

Described from six males and four females. Common; taken on Umbelliferæ in Leicestershire, and again near Barnstaple.

C. annulipes, Thoms., Opusc. Ent., vi., 1874, p. 572, ♀ agrees with this, so far as the description extends;

but the writer doubts whether his species be the same as Wesmael's. Wesmael quotes *annulatus*, Nees, as a synonym, but doubtfully, because the latter has testaceous femora; in his Supplement he changes his mind, and thinks they may be the same, since H.-Schäffer (F. G., cliv., 23) describes the femora as sometimes black. Reinhard's opinion has been already mentioned (see sp. 4). Wesmael also states that the males of his *C. fenestratus* belong to *annulipes*, var. 1 (without pale spots on the abdomen). But *fenestratus*, Nees, Wesm., is made up of the sexes of two different species, and the name ought to be abandoned. Reinhard pronounces *sulcatus*, Nees, ♂ to be certainly the same as *annulipes*, Wesm. (but not necessarily its varieties); and *fenestratus*, Nees, ♂ probably the same as *annulatus*, Nees. This is fortunately almost the last sample of the nomenclature of *Chelonus* we shall have occasion to give. The present insect is clearly not *annulatus*, Nees, nor *annulipes*, Wesm., but var. 1 of the latter, which seems a good species, and requires a name.

7. *Chelonus decorus*, n. s.

Niger, abdomine triangulariter bimaculato; palpis testaceis, basi fuscis; pedibus rufo-testaceis, femoribus anterioribus basi, posticis præter apicem, nigris; tibiis posticis apice basique, tarsis omnibus apice, fuscis. Alæ subfusco-hyalinæ, stigmate nervisque fuscis, costa et parastigmate cum nervo præbrachiali testaceis, squamulis nigris; areola radialis brevis, lata; abscissa 3tia extus vix concava; alarum inferarum radius sinuatus. Vertex transversus, pone oculos contractus; genæ haud dilatatæ. Antennæ ♀ 27-articulatæ, ultra medium dilatatæ, apice teretiusculæ, corpore breviores. Fovea frontalis parva, nitida, parum rugulosa. Mesothorax antice variolosus, postice reticulatus. Scutellum confertim variolosum, punctis majoribus undique cinctum. Metathorax a basi declivis, apice truncato, angulis posticis vix dentiformibus. Abdomen postice latius, thorace longius, apice rotundato, more solito scabratum, carinis basalibus nullis. Terebra recondita.

Black; abdomen with 2 triangular basal yellowish spots; palpi and tips of mandibles rufo-testaceous, the former dusky at the base; legs rufo-testaceous, fore and middle femora at the base, hind femora except the apex, black; hind tibiæ fuscous at both ends; all the tarsi testaceous with fuscous tips. Wings subfusco-hyaline, stigma and nervures fuscous, costa, parastigma, and præbrachial nervure testaceous, squamulæ black; radial areolet broader but not longer than the stigma; 3d abscissa of the radius slightly concave outwardly; radius of the hind wings sinuated. Body scarcely shining. Head with a transverse vertex, slightly contracted behind the eyes, cheeks not dilated; reticulato-rugose, orbits and cheeks striolated, the face transversely; clypeus punctulate, shining; frontal fovea small, shining, somewhat rugulose. Antennæ ♀ 27-jointed, dilated and compressed beyond the middle, not much attenuated at the tips, shorter than the body. Mesothorax in front variolose, rather shining, reticulated before the scutellum, which is thickly variolose, margined with coarser punctures. Metathorax coarsely reticulated, the disk inclined from the base, truncate behind, the angles hardly denticulated. Abdomen longer than the thorax, a little wider behind, rounded, not obtuse, at the apex, depresso-cylindrical, covered with the usual oblong reticulations becoming finer posteriorly, the apex rather shining; basal carinæ none. Terebra concealed. ♀. Length, 2; wings, 3¾ lin.

At first sight like *C. dispar*, sp. 8, ♀, but the abdomen is considerably longer in proportion, the antennæ are much more than 16-jointed, and the sculpture is finer. The yellowish abdominal spots are triangular, and widely separated in the middle.

One specimen is in Fitch's collection, the origin of which is not stated.

8. *Chelonus dispar*, n. s.

Niger; abdomen bimaculatum, maculis triquetris, subconfluentibus. *Maris* pedes flavo-testacei, coxis, femorum intermediorum plaga, femoribus posticis præter basin totis, tibiarum posticarum apice basique (hac anguste) nigris, tarsis fuscis basi testaceis: *feminæ* trochanteres partim fusci, femora intermedia fere ad apicem nigra. Alæ infumatæ, costa, nervis, stigmate, fuscis; parastigmate, nervo præbrachiali, squamulis, fusco-testaceis; areola radialis stigmate longior vix latior; abscissa tertia extus leviter concava; alarum inferarum radius sinuatus. Vertex transversus, pone oculos contractus; genæ haud dilatatæ. Antennæ ♂ 28-, ♀ 16-articulatæ, ultra medium dilatatæ, apice ipso teretiusculo, corpore multo breviores. Fovea frontalis carinata, geminata, haud nitida. Mesothorax antice punctulato-rugulosus, postice fortiter reticulatus, sulcatus. Scutellum rugulosum. Metathorax brevis, truncatus, bis in longitudinem carinatus, angulis posticis dentiformibus. Abdomen quam præcedenti brevius, sculptura solita fortiori; maris apice integrum. Terebra recondita.

Black; abdomen at the base with 2 large triangular yellowish subconfluent spots; legs ♂ flavo-testaceous; coxæ, a streak on the intermediate femora, hind femora except at the base, hind tibiæ at the apex and narrowly at the base, black; tarsi fuscous, 1st joint more or less testaceous; in the ♀ the trochanters are partly fuscous, and the intermediate femora black nearly to the apex. Wings infumated, especially towards the apex; costa, nervures, and stigma fuscous; parastigma, præbrachial nervure, and squamulæ dull testaceous; radial areolet longer but not broader than the stigma; 3d abscissa of the radius slightly curved; radius of hind wings sinuated. Body scarcely shining. Head with a transverse vertex, contracted behind the eyes, cheeks not dilated; punctulate in front, orbits and cheeks striolated; frontal fovea shallow, geminated by a carina. Antennæ ♂ 28-jointed, filiform to about the 18th joint, thence gradually attenuated, as long as the body; of the ♀ 16-jointed, dilated from the middle to near the apex, the last 3 joints smaller. Mesothorax rather shining in front, punctulato-rugulose, coarsely reticulated or sulcate behind. Scutellum rugulose. Metathorax reticulated, short, truncate, the basal portion more horizontal than in the last species, with 2 medial carinæ, and the hind angles dentiform. Abdomen at the base sulcate, afterwards reticulato-rugose, striated, behind more finely, the apex somewhat shining. Anus ♂ imperforate; terebra ♀ concealed. ♂ ♀. Length, 1½; wings, 3 lin.

Described from two males and one female. The agreement between the sexes is so complete that I cannot do otherwise than join them, though the ♀ was taken separately. It would be mere guess-work to attempt to name them from the books; *C. cylindrus*, Nees, Mon., i., 291, ♂ may perhaps be compared, having 29- (*i.e.*, 28-) jointed antennæ; but it is a larger insect (2½ lin. long), and otherwise different. *C. fenestratus*, var. β, Nees, might be the ♀, but it has no separate description, and the typical form in either sex is quite beside the mark. Thomson's *C. fenestratus* ♂ has 23-jointed antennæ, and the description is too short; but in any case that name cannot stand. My specimens are old, and some few details cannot well be taken from them.

The two males are from Darenth Wood; the female from Milford Haven.

Reinhard (Berl. ent. Zeit., 1867, p. 360) has proposed to make another genus of those *Cheloni* whose females have 16-jointed antennæ, and the males a perforated abdomen. But the existence of such a species as the present, together with others indicated by Thomson, shows that there is no necessary correspondence between the sexes in these respects.

9. *Chelonus canescens*, Wesm. (Pl. V., fig. 1).

Chelonus canescens, Wesm., Nouv. Mém. Ac. Brux., 1835, p. 224, ♀; Thoms., Opusc. Ent., vi., 1874, p. 574, ♂ ♀.

Black; abdomen immaculate; palpi pale; mandibles testaceous in the middle; coxæ and upper trochanters black; legs rufo-testaceous, fore femora at the base, 4 posterior entirely except the apex, and apical half of hind tibiæ, black, these last with an obsolete dusky ring near the base; tarsi fuscous, the hind pair blackish. Wings subfumato-hyaline, darker towards the apex, stigma and nervures fuscous, costa, parastigma, præbrachial nervure, and squamulæ testaceous; radial areolet broader than the stigma, 3d abscissa of the radius straight, radius of the hind wings straight, except its basal curvature. Body not shining, thinly beset with whitish hairs, which become thicker on the face, so as almost to conceal the surface, and form 2 tufts at the angles of the metathorax. Head minutely subrugulose, almost coriaceous; vertex transverse, contracted behind the eyes; cheeks not dilated; frontal fovea ample, shallow, not shining, nor geminated. Antennæ ♂ 23-jointed (about 20-jointed according to Thomson), somewhat longer than the body; of the ♀ 18-jointed, as long as the body, slightly compresso-dilated beyond the middle, joints 15—17 tapering, 18 abruptly smaller, linear. Mesothorax somewhat shining and punctulate in front, subreticulated with longer punctures before the scutellum, which is minutely punctulate and almost smooth; post-scutellum not dentiform. Metathorax inclined from the base, hardly truncate posteriorly, reticulato-rugose, bluntly 4-dentate, with 2 short medial ridges not reaching the base or the apex. Abdomen hardly as long as the head and thorax, ovate, rounded behind, reticulato-rugulose at the base, and with 2 short carinæ placed obliquely, the reticulations shorter and finer posteriorly, interspersed with indistinct punctiform impressions; abdomen ♀ broader and more rounded than that of the ♂, which is imperforate at the anus. Terebra concealed. ♂ ♀. Length, $1\frac{1}{3}$—$1\frac{3}{4}$; wings, $2\frac{3}{4}$—3.

Very like *C. corculus*, sp. 6, but differing in the antennæ, the pubescence of the face, the testaceous squamulæ, the radial areolet, and the radius of the hind wings. *C. retusus*, Nees, ♀ may be suspected of being this species; it has 18- (*i. e.*, 17-) jointed antennæ, and the abdomen grooved beneath at the apex to receive the point of the terebra. The latter character means very little, and may be seen in many females accidentally. Wesmael, however, states that its absence is the only reason why he did not join the two species. A greater difficulty seems to arise from the silence of Nees respecting the dense pubescence of the face, which distinguishes *canescens* from all other species. Thomson doubtfully assigns *retusus*, Nees, to his own *caudatus*.

Described from one male and three females. A pair is in Cameron's collection, from Clober, Scotland; Fitch possesses a ♀, and another was taken by me in Bradgate Park, Leicestershire.

10. *Chelonus catulus*, n. s.

Niger, abdomine immaculato; palpis nigricantibus, mandibularum apice rufo. Pedes antici rufo-testacei, femorum basi latius nigra; posteriores nigri, tibiarum intermediarum basi et apice, posticarum basi tantum, trochanteribus inferis omnibus, rufo-testaceis; tarsi fusci, apice potius nigro. Alæ subfuscæ stigmate, costa, parastigmate, nervis nigricantibus, præbrachiali modo subrufescente, squamulis nigris; areola radialis stigmate brevior, latior; abscissa 3tia recta; alarum inferiorum radius subrectus. Corpus opacum, subtiliter confertim punctulatum fere coriaceum. Genæ dilatæ, unde caput subcubicum, pone oculos non contractum; facies albido-pubescens; fovea frontalis ampla, geminata; orbitæ cum genis striolatæ. Maris antennæ 32-articulatæ, corpore longiores. Mesothorax punctulatus, prope scutellum subreticulatus; hoc immarginatum. Metathorax brevis, crasse reticulatus, acute bidenticulatus. Abdomen thorace longius, cano-pubescens, more solito subtilius scabratum, carinis basalibus nullis, ano imperforato.

Black; abdomen immaculate; palpi blackish; tips of mandibles rufous; fore legs rufo-testaceous, $\frac{2}{3}$ of their femora black; 4 posterior legs black, intermediate tibiæ at both ends, hind tibiæ at the base only, and all the lower trochanters, rufo-testaceous; tarsi fuscous, darker at the tips. Wings subfuscous, stigma, parastigma, costa, and nervures blackish, only the præbrachial nervure subrufescent; squamulæ black; radial areolet shorter and broader than the stigma; 3d abscissa straight; radius of hind wings nearly so. Body dull, minutely and thickly punctulate, almost granulated; head transverso-cubical, not contracted behind the eyes, cheeks dilated; face beset with whitish pubescence; frontal fovea ample, geminated; cheeks and orbits striolated. Antennæ ♂ 32-jointed, $\frac{1}{4}$ longer than the body, setaceous. Prothorax not produced. Mesothorax somewhat shining, thickly punctulate, subreticulated with confluent punctures before the scutellum, which is also thickly punctulate, and not margined. Metathorax short, transverse, coarsely reticulated, acutely bidenticulate. Abdomen longer than the thorax, sparingly covered with grey pubescence, ovato-cylindrical, depressed at the base and striated with oblong reticulations becoming finer posteriorly to the rounded apex; basal carinæ none; anus not perforated. ♂. Length, $1\frac{1}{2}$; wings $2\frac{3}{4}$ lin.

Most like *C. secutor*, sp. 13, but differing in the imperforate anus, short prothorax, darker wings, and longer antennæ.

Taken at Nunton, near Salisbury, in an osier-ground.

11. *Chelonus pusio*, n. s.

Niger, abdomine immaculato; palpis nigricantibus, mandibularum apice piceo. Femorum anticorum apices cum tibiis ferruginei; tibiæ posteriores ferrugineæ apice basique nigræ; tarsi nigricantes. Alæ fusco-hyalinæ stigmate nervisque fuscis, parastigmate nervoque præbrachiali testaceis, squamulis nigris; areola radialis lata, stigmate brevior; abscissa 3tia modo non recta; alarum inferiorum radius etiam basi vix curvatus. Corpus opacum, confertim subtilius ruguloso-punctulatum. Genæ dilatæ, unde caput subcubicum, pone oculos haud contractum; fovea frontalis minime profunda, subobsoleta. Maris antennæ crassæ 23-articulatæ, setaceæ. Mesothorax et scutellum fere coriacea, hoc immarginatum; post-scutellum elevatum, tuberculiforme. Metathorax reticulatus, basi deplanatus, postice truncatus, vix bidenticulatus, medio carinatus. Abdomen, ut assolet, scabratum, baseos carinis duabus inchoatis, ano imperforato.

Black; abdomen immaculate; palpi dusky; mandibles pitchy at the apex; tips of the fore femora, and all the tibiæ, ferruginous, the 4 posterior black at both ends; tarsi blackish. Wings fusco-hyaline, nervures and stigma fuscous, parastigma and præbrachial nervure testaceous, squamulæ black; radial areolet broad, shorter than the stigma; 3d abscissa almost straight; radius of hind wing hardly curved at the base. Body dull, thickly and minutely ruguloso-punctulate. Head transverso-cubical, not contracted behind the eyes; cheeks dilated; frontal fovea very shallow, subobsolete. Antennæ 23-jointed, stout, setaceous, very slightly tapering towards the apex (hence probably a ♂). Mesothorax and scutellum thickly and minutely punctulate, almost coriaceous; the latter not margined; post-scutellum elevated into a tubercle. Metathorax horizontal, truncated behind, reticulato-rugulose, carinated in the middle, hardly bidenticulate. Abdomen deplanato-cylindrical, broader posteriorly, obtuse (hence probably a ♂), sculptured as usual, and with two inchoate basal carinæ; anus not perforated. ♂. Length, $1\frac{1}{3}$; wings, $2\frac{1}{3}$ lin.

Very like *sulcatus*, Nees, ♂, but distinguished by wanting the anal fissure. The sex can only be inferred from the antennæ (which are not quite conclusive) and from the obtuse abdomen, which is not likely to be that of a ♀.

The single specimen was bred by W. H. B. Fletcher from *Elachista atricomella*, Staint., or *E. luticomella*, Zell.

12. *Chelonus risorius*,[*] Reinh.

Chelonus risorius, Reinh., Berl. ent. Zeit., 1867, p. 360, ♂.

Black; abdomen immaculate; palpi black; fore tibiæ and tips of the fore femora testaceous; or all the tibiæ like the tarsi, piceous. Wings infumated, stigma and nervures fuscous, only the præbrachial testaceous; squamulæ black; 3d abscissa straight; radius of hind wings straight except a slight basal curve. Body slightly shining, punctulato-rugulose. Head finely aciculated, striolated on the cheeks and orbits, transverso-cubical, not contracted behind the eyes, cheeks subdilated; frontal fovea not shining. Antennæ shorter than the body, 20- (according to Reinhard 18-) jointed. Mesothorax punctulato-rugulose, coarsely reticulated just before the scutellum, which is rugose. Metathorax reticulated, acutely bidenticulate at the hind angles, and obtusely on each side of the base. Abdomen longer than the head and thorax, somewhat wider behind, striato-rugose, the rugosity becoming gradually finer to the rounded aciculated apex; anus ♂ perforated, the fissure ten times broader than long, extending to some distance along the sides of the abdomen, its margins very smooth and shining. ♂. Length, 1½—2½; wings, 3—5 lin.

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[*] The following is another large species, the ♂ of which exhibits the anal fissure. As the ♀ has not been before noticed, it may be useful to describe it here:—

C. nitens, Reinh., Berl. ent. Zeit., 1867, p. 360.

Black, fore femora at the apex, fore tibiæ, intermediate tibiæ on one side, or entirely, and the hind pair in the middle, testaceous. Wings subhyaline, stigma and nervures fuscous, parastigma and præbrachial testaceous, squamulæ black; radial areolet twice as large as the stigma, 3d abscissa slightly curved, radius of hind wings straight except at the base. Head minutely rugulose, vertex transverse, cheeks dilated. Antennæ ♂ broken (25-jointed according to Reinhard); of the ♀ 27-jointed in one specimen, broken in the other. Mesothorax punctate, shining in front, reticulato-rugose behind; scutellum shining, punctulate. Metathorax dull, rugose, reticulated, bidentate. Abdomen with the usual sculpture, that of the ♂ longer than the head and thorax, subcylindrical, apical fissure three times broader than its length, margined, ciliated; of the ♂ shorter, rounded at the sides, and wider behind. Terebra and valvula ventralis visible, prolapsed. ♂ ♀. Length, $2\frac{1}{2}$; wings, 5 lin.

Equal in size to *C. inanitus*. The sexes correspond in all respects, and the antennæ of the ♀ show that *C. erosus*, Schäff., F. G., cliii., 9, which has 16-jointed antennæ, does not belong to this species.

A male and two females were taken by Sharp in the Sierra Nevada.

I have not seen the ♀, which Reinhard conjectures may possibly be *C. subemarginatus*, Schäff., F. G., cliii.

Reared by Billups from the galls of *Andricus terminalis*, Fab., in which numerous insects, including some lepidopterous larvæ, find food and shelter.

13. *Chelonus secutor*, n. s.

Niger, abdomine immaculato; palpis nigricantibus, mandibularum apicibus piceis. Pedes ferruginei, trochanteribus superis, femorum anteriorum basi, posticis præter lateris superioris lituram totis, tibiarum posticarum apice, tarsis omnibus, nigris. Alæ infumatæ, stigmate nervisque nigricantibus, squamulis nigris; areola radialis brevis, lata, stigmati æqualis; abscissa 3tia subbisinuata; alarum inferiorum radius basi tantum leviter inflexa. Corpus elongatum, parum nitidum, subtilius rugulosum. Caput scabriculum orbitis striolatis, propter genarum tumorem postice latius; facies cano pubescens; fovea frontalis ampla, geminata, nitida, postice striolata, parum profunda. Antennæ 25-articulatæ, corpore non breviores. Prothorax eximius, productus, striolatus. Mesothorax confertim punctulatus, juxta scutellum variolosus; hoc immarginatum. Metathorax subtiliter reticulatus, truncatus, angulis posticis obtusis. Abdomen capite et thorace haud brevius, a basi inde ad apicem obtusum sensim dilatatum, sculptura solita, carinis duabus baseos inchoatis, rima anali transversa, oblonga.

Black; abdomen immaculate; palpi dusky; mandibles pitchy at the apex; legs ferruginous, upper trochanters, 4 anterior femora at the base, hind pair entirely except a spot on the upper edge, 4 posterior tibiæ at the apex, and all the tarsi, blackish. Wings infumated, nervures stout, and, together with the stigma and parastigma, blackish; squamulæ black; radial areolet short, broad, as large as the stigma; 3d abscissa slightly bisinuated, convex outwardly near the apex; radius of hind wings somewhat curved near the base, radial areolet narrowly lanceolate. Body dull, elongate, minutely rugulose. Head finely shagreened, striolated round the orbits; cheeks much dilated, so that the head seen from above is widest behind the eyes; face thinly beset with whitish hairs; frontal fovea large, shallow, smooth in front, striolated behind, geminated. Antennæ 25-jointed, as long as the body, and much longer than those of *C. sulcatus*, Nees, sp. 15, ♂. Prothorax unusually produced, forming a distinct neck, somewhat shining, striolated. Mesothorax thickly punctulate, variolose with larger punctures before the scutellum, which is also punctulate and not margined. Metathorax finely reticulated, transverse, truncate, not denticulated. Abdomen as long as the head and thorax, sculptured as usual, with 2 inchoate carinæ among the basal striæ, narrowest at the base, and increasing in width to the obtuse apex, beneath which is an oblong transverse fissure with a small angular projection on its upper edge, and ciliated with whitish hairs. ♂. Length, $1\frac{1}{2}$; wings, $2\frac{3}{4}$ lin.

The elongate form, produced prothorax, shape of the head, and length of the antennæ, distinguish this from *sulcatus*, Nees, *latrunculus*, n. s., and *parcicornis*, Schäff. It belongs to Thomson's last section, with cubical head, immarginate scutellum, &c., but apparently not to any of his species.

I found one male in an osier-ground at Nunton, near Salisbury.

14. *Chelonus parcicornis*, Schäff.

Chelonus parcicornis, Schäff., F. G., cliv., 30; Wesm., Nouv. Mém. Ac. Brux., 1838, p. 162, ♀; Reinh., Berl. ent. Zeit., 1867, p. 359, ♂ ♀.

C. eurytheca, Wesm., *lib. cit.*, 1838, p. 158, ♂ (wrongly called ♀).

Black; abdomen immaculate; palpi, mandibles at the apex, and legs, testaceous; coxæ black, the fore pair somewhat pitchy; fore femora fuscous on both edges, posterior blackish, the extreme tips testaceous; hind tibiæ broadly black at the apex, narrowly fuscous at the base; tarsi fuscous. Wings infumated; a whitish streak under the stigma, which, with the nervures, is fuscous; parastigma and præbrachial hardly paler; radial areolet larger than the stigma, 3d abscissa straight, radius of hind wings very slightly curved at the base; squamulæ testaceous. Head and mesothorax somewhat shining, minutely ruguloso-punctulate; the former almost coriaceous, not contracted behind the eyes, cheeks subdilated, frontal fovea smooth, shining, carinated in the middle. Antennæ ♂ as long as the body, 27—30-jointed (27- in English specimens); of the ♀ 16-jointed. Mesothorax more rugulose than the head, especially near the scutellum, which is shining in the middle. Metathorax reticulated, rugose, bidenticulate. Abdomen rather shorter than the head and thorax, sculptured as usual; at the apex is a large transversely ovate fissure, not quite twice as broad as long, ciliated. The ♀, which I have not seen, is said to have the coxæ testaceous at the apex, and the anus emarginate beneath to receive the point of the subexserted terebra. ♂ ♀. Length, $1\frac{1}{2}$; wings, $2\frac{3}{4}$ lin.

Described from three males taken in Epping Forest, Yorkshire, and near St. Albans; and a fourth bred by W. H. B. Fletcher, July 1st, from *Scoparia phæoleuca*, Zell. Reinhard examined five males and nine females from Germany and Switzerland; two were reared by Von Heyden from the cases of a *Tineid* feeding on juniper.

15. *Chelonus sulcatus*, Nees. (Pl. V., fig. 1 *a*).

Chelonus sulcatus, Nees, Mon., i., 293, ♂ (wrongly called ♀; antennæ 23-jointed); Reinh., Berl. ent. Zeit., 1867, p. 359, ♂ ♀; not of Wesm.

C. fenestratus, Nees, Mon., i., 292, ♀ only; not the vars.; antennæ 17- (*i. e.*, 16-) jointed; Wesm., Nouv. Mém. Ac. Brux., 1835, p. 223, ♀ only.

C. contractus, Nees, Mon., i., 298, ♀; not of Ratz., Ichn. d. Forst., ii., 24, which is there wrongly placed under *Ascogaster*.

Black; abdomen immaculate; palpi, tips of mandibles, 4 anterior femora at the apex, their tibiæ, and a broad ring on the hind tibiæ, testaceous; middle tibiæ often annulated with fuscous near the base. Wings infumated; a whitish streak under the stigma, which, with the nervures and costa, is fuscous; parastigma and præbrachial nervure testaceous; radial areolet short, of the same size as the stigma, 3d abscissa straight, radius of hind wings very slightly curved at the base; squamulæ fuscous. Sculpture as in the last species; head transverse, contracted behind the eyes, cheeks not dilated; frontal fovea dull, rugulose, carinated in the middle. Antennæ ♂ as long as the body, 23—24-jointed; of the ♀ much shorter, 16-jointed, filiform. Scutellum rugulose. Metathorax bidenticulate. Abdomen ♂ with an oblong, reniform anal fissure, thrice as broad as long, margined and ciliated all round. ♂ ♀. Length, 1½; wings, 2¾ lin.

Described from one male and ten females, all taken at the same time and place. A second male in Fitch's collection is rather doubtful, having the radial areolet longer and more acute; the antennæ are 24-jointed, and the other characters are those of the description, except that the hind tibiæ are testaceous only at the base. Unless the sexes of these small species are taken or bred together, and in some numbers, they can scarcely be determined. Formerly found by me rather commonly on umbellate flowers in Leicestershire. Reinhard examined 32 males and 37 females from central Europe; some of them were bred from *Retinia buoliana*, Schiff. Brischke reared one from a *Tortrix*, and another from a *Gelechia*, perhaps *G. mulinella*, Zell.; he describes the cocoon as 6 mm. long, elliptical, white, shining, and transparent.

The synonymy given above is that determined by Reinhard, with the exception of *C. lugubris*, Wesm., Nouv. Mém. Ac. Brux., 1835, p. 219, ♂ (wrongly called ♀); and *C. sulcatus*, Jurine, Hym., 291, pl. xii., f. 41, ♀, which are both questionable. Jurine, it is true, is the author of the name *sulcatus*, but his figure, unaccompanied by a description, is a mere hieroglyphic (as Wesmael remarks); the only thing certain is that he has represented some species of which the ♀ has 16-jointed antennæ. Thomson describes no *sulcatus*, but observes that his *C. depressus* (Opusc. Ent., vi., 1874, p. 576, antennæ ♂ 21-jointed) is much like *C. sulcatus*, Wesm. He has also restored the confusion which Reinhard laboured to clear up, by making *C. lugubris*, Wesm., a synonym of *C. parcicornis*, Thoms. (not of Schäff. and Reinh.), and by redescribing *C. fenestratus*, Nees, in terms altogether vague, as a distinct species. *C. parcicornis*, Thoms., seems to be the following species.

16. *Chelonus latrunculus*, n. s.

Niger, abdomine immaculato, palpis concoloribus, mandibulis apice rufescentibus. *Feminæ* pedes cum trochanteribus rufo-testacei, coxis nigris, tarsis et tibiarum posticarum apicibus infuscatis. *Maris* femora anteriora medio late, postica tota, tibiæ posticæ apice, nigra. A *C. sulcato* haud facili negotio dignoscendus.

Caput, ut videtur, magis cubicum, genis deorsum productis, dilatatis, oculis minoribus, antennis multo tenuioribus, *maris* 22-, *feminæ* 16-articulatis, ultra medium incrassatis, flagelli basi rufa. Abdomen minus ovatum juxta basin angustatum, lateribus magis parallelis; maris rima anali potius cordiformi vel subcirculari, subtus emarginata, ibidemque ciliata, limbo undique depresso splendente; pedibus denique feminæ fere totis testaceis.

Black; abdomen immaculate; palpi black; mandibles rufescent at the tips; legs ♀ rufo-testaceous, including the trochanters, coxæ black, tarsi and tips of hind tibiæ fuscescent; of the ♂ the four anterior femora are black, testaceous at both ends, hind femora entirely, and their tibiæ at the apex, black. Very like *C. sulcatus*, Nees, but distinguished as follows:—Head less transverse, more orbicular, cheeks produced downwards, and somewhat dilated; eyes smaller; antennæ more slender, of the ♂ 22-, of the ♀ 16-jointed, compresso-dilated beyond the middle, the last 3—4 joints abruptly diminishing; 1st joint of the flagellum testaceous. Abdomen less oval, more contracted at the base, the sides more parallel; anal aperture of the ♂ narrower and longer, *i.e.*, more cordiform, emarginate on the lower side and there ciliated, with a depressed shining margin. ♂ ♀. Length, 1½; wings, 2¾ lin.

The colour of the legs in the female renders it probable that this may be *C. parcicornis*, Thoms., Opusc. Ent., vi., 1874, p. 579, ♂ ♀, but not of Schäffer and Wesmael. The sexes differ only in the colour of the femora, and as they were taken together I presume that they are correctly paired.

Described from two pairs captured in Northants, and another from Cadder Wilderness, near Glasgow, in Cameron's collection; also a male taken by Fitch at Maldon.

17. *Chelonus exilis*, n. s.

Niger, abdomine immaculato, palpis nigricantibus, mandibulis apice rufis. Pedes antici testacei, femorum basi nigra; posteriores nigri tibiis obscure ferrugineis, posticis apice basique fuscis; tarsi fusci. Alæ fumato-hyalinæ, stigmate nervisque pallide, parastigmate et costa obscurius fuscis; squamulæ nigricantes; areola radialis stigmate major; abscissa 3tia recta; alarum inferiorum radius sinuatus. Corpus parum nitidum, subtiliter scabriculum, parcius cano pubescens. Caput subcubicum, pone oculos haud contractum, genis dilatatis, subcoriaceum, clypeo læviore; fovea frontalis minima, obsoleta. Antennæ maris 23-, feminæ 16-articulatæ. Mesothorax subtiliter punctulatus, subcoriaceus. Scutellum immarginatum; post-scutellum haud elevatum. Metathorax reticulatus, in longitudinem bis terve carinulatus, obtuse bidenticulatus. Maris rima analis fere orbicularis; feminæ terebra conspicienda quidem, sed anum haud attingens, recta, valvulis compressis, testaceis, pilosis.

Black; abdomen immaculate; palpi blackish; mandibles tipped with rufous; fore legs testaceous, their femora black at the base; posterior legs black, their tibiæ obscurely rufous, the hind pair fuscous at the base and apex; tarsi fuscous. Wings fumato-hyaline, nervures and stigma pale fuscous, parastigma and costa darker; squamulæ fuscous; radial areolet larger than the stigma; 3d abscissa straight; radius of the hind wings sinuated. Body dull, minutely scabrous, and sparingly beset with grey pubescence. Head subcoriaceous, subcubical, not contracted behind the eyes, cheeks dilated; clypeus almost smooth; frontal fovea minute, obsolete. Antennæ ♂ 23-, ♀ 16-jointed. Mesothorax punctulate, subcoriaceous. Scutellum not margined; post-scutellum not elevated. Metathorax reticulated, with 2 or 3 longitudinal raised lines, bluntly bidenticulate. Abdomen as long as the head and thorax, of the ♂ slightly widened and obtuse behind, of the ♀ elliptical; finely reticulated at the base, afterwards punctulate; basal carinæ none. Anal aperture of the ♂ nearly circular; terebra of the ♀ visible, but not reaching the anus; valves testaceous, compressed, hairy. ♂ ♀. Length, $1\frac{1}{3}$; wings, $2\frac{1}{2}$ lin.

This species differs from *C. parcicornis*, Schäff., in the number of joints of the antennæ; from *sulcatus*, Nees, in its more slender form, dilated cheeks, and longer antennæ; from *latrunculus*, n. s., similarly, and also in the colour of the legs.

Described from two males and a female, which were bred, June 5th, by Warren from *Cosmopteryx Lienigiella*, Zell.

18. *Chelonus basalis*, Cur.

Chelonus basalis, Cur., B. E., 672, No. 8, ♀.

Black; basal third of the abdomen determinately testaceous; legs black; fore femora at the apex, their tibiæ, and the base of the hind tibiæ, testaceous. Wings fuscescent, nervures and stigma fuscous; radial areolet, &c., as in the other small species. Antennæ ♀ 16-jointed, stout, shorter than the body, incrassated before the apex. Body dull, minutely punctulate, pubescent. Metathorax bidenticulate, and with two medial longitudinal carinæ. Terebra concealed. ♀. Length, $\frac{3}{4}$; wings, $1\frac{1}{2}$ lin.

The smallest known British species, and easily distinguished by the colour of the abdomen. I have not seen the male, but most likely it is one of those furnished with an anal perforation. The two specimens at hand are very old, and in no condition to be described.

Discovered by Walker, and briefly noticed by Curtis, *l. c.* One of the original specimens is in my collection, and more, as I learn from Prof. Westwood, in the Oxford Museum.

iii. ASCOGASTER, *Wesm.*

Wesm., Nouv. Mém. Ac. Brux., 1835, p. 226.

Eyes glabrous. First cubital areolet distinct from the præ-discoidal. Otherwise identical with the preceding genus.

A convenient artificial section of *Chelonus*, improperly called a genus, co-extensive with Section III. of Nees. Wesmael originally included in it *Chelonus dentatus*, Panz., but for this he afterwards formed, with better reason, the genus *Phanerotoma*. The species have been revised by Reinhard in the Berl. ent. Zeit., 1867, where he describes seventeen, of which nine have been detected in Britain. These appear to have been all known to Haliday and Curtis; the latter is the only English writer who has described any, but the descriptions are mostly insufficient for their determination. We have added a single new species.

TABLE OF SPECIES.

(14)	1.	Trochanters rufous (the anterior sometimes fuscous at the base).	
(3)	2.	Clypeus truncate, reflexed, with a medial acute denticle	1. *instabilis*, Wesm.
(2)	3.	Clypeus obtusangular or rounded.	
(5)	4.	Hind tibiæ fuscous, with a white ring ..	2. *annularis*, Nees.
(4)	5.	Hind tibiæ rufous, tipped with fuscous.	
(9)	6.	Coxæ rufous, sometimes black at the base.	
(8)	7.	Mesothorax with distinct[*] punctures ..	3. *rufipes*, Latr., ♂.
(7)	8.	Mesothorax reticulato-rugose	4. *elegans*, Nees.
(6)	9.	Coxæ black.	
(11)	10.	Hind tarsi whitish at the base	3. *rufipes*, Latr., ♀.
(10)	11.	Hind tarsi entirely fuscous, or sometimes reddish at the base.	

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[*] Except a space before the scutellum, and the mesothoracic sutures, which in all the species are reticulato-rugose.

(13) 12. Mesothorax punctured; clypeus tridenticulate .. .. 5. *rufidens*, Wesm.
(12) 13. Mesothorax reticulato-rugose; clypeus obtusangular .. .. 6. *Ratzeburgii*, n. s.
(1) 14. Trochanters black.
(18) 15. Mesothorax punctured.
(17) 16. Clypeus rounded.. .. .. .. 7. *variipes*, Wesm.
(16) 17. Clypeus bidenticulate .. .. .. 8. *bicarinatus*, Schäff.
(15) 18. Mesothorax reticulato-rugose.
(20) 19. Front impressed with a distinct margined fovea .. .. 9. *armatus*, Wesm.
(19) 20. Front with an obsolete fovea, which is not margined .. .. 10. 4-*dentatus*, Wesm.

1. *Ascogaster instabilis*, Wesm. (Pl. V., fig. 2).

Ascogaster instabilis, Wesm., Nouv. Mém. Ac. Brux., 1835, p. 227; Reinh., Berl. ent. Zeit., 1867, p. 364; Thoms., Opusc. Ent., vi., 1874, p. 582, ♂ ♀.
A. Esenbeckii, Cur., B. E., 672, No. 8, ♂.
A. pallida, Ruthe, Stett. Zeit., 1855, p. 293.
Chelonus femoralis and *rufiventris*, Schäff., F. G., cliv.

Black; antennæ at the base, thorax, abdomen, and legs, more or less rufo-testaceous; trochanters rufo-testaceous. Head very finely punctulato-rugulose; clypeus discrete, depressed, unidentate, the apical margin truncate. Mesothorax and pleuræ punctulate, the latter impressed with a rugose fovea. Metathorax reticulato-rugose, truncate, hardly bidentate. ♂ ♀. Length, $1\frac{1}{2}$—$2\frac{1}{4}$, wings, 3—$4\frac{1}{2}$ lin.

Palpi black. In the ♂ the base of the abdomen is more or less rufo-testaceous; the fore femora at the apex, and all the tibiæ, usually of the same colour; the middle or hind tibiæ, or both, blackish at the apex. Antennæ longer than the body, 32—39-jointed. Abdomen with two short basal parallel carinæ, sometimes obsolete. Wings slightly infuscated, with a whitish streak under the stigma, which in large specimens has a pale dot at the base; cubital and anal nervures distinct; recurrent nervure interstitial. Antennæ ♀ 35-jointed (in one specimen), as long as the body, the basal half usually testaceous, as are also the thorax more or less, the abdomen at the base or entirely, and the legs; the posterior femora, and hind tibiæ at the apex, commonly fuscous. The largest British species, distinguished by its truncate clypeus, long antennæ, and conspicuously testaceous abdomen; that of the ♂, however, is often wholly black.

Described from two females and four males. Not uncommon; Leicestershire, Devonshire, Yorkshire, Essex, &c. Glanville's Wootton, taken by Dale (Curtis).

2. *Ascogaster annularis*, Nees.

Chelonus annularis, Nees, Mon., i., 286, ♂.
Ascogaster annularis, Reinh., Berl. ent. Zeit, 1867, p. 369, ♂ ♀.

Black; mandibles, palpi, antennæ at the base beneath, and legs, rufo-testaceous; posterior, or only hind, coxæ, sometimes hind femora above, and hind tibiæ, fuscous, these last with a white ring in the middle; hind tarsi fuscous; trochanters rufo-testaceous. Abdomen with or without two lateral basal testaceous spots, which are sometimes confluent on the disk. Head and thorax thickly and finely punctulato-rugulose; scutellum smooth; metathorax and abdomen reticulato-rugulose, the former with two or three irregular carinæ. Clypeus hardly discrete, rounded at the apex. Mesothoracic sutures obsolete. Mesopleuræ punctulate. Metathorax edentate. ♂ ♀. Length, $1\frac{1}{3}$—$1\frac{1}{2}$; wings, $2\frac{1}{2}$—3 lin.

Antennæ ♂ filiform, 23—25-jointed; ♀ distinctly shorter than the body, incrassated before the apex, 21-jointed. The species may be known by its small size, fine sculpture, and the colour of the hind tibiæ.

Described from three males and one female. A male was bred by Bignell from old furze-sticks containing larvæ of *Œcophora lambdella*, Donov. The others I captured somewhere in the London district. Hellins took a male at Weston-super-Mare. Bred by Von Heyden from one of the *Coleophoridæ*, according to Reinhard; by De Graaf from *Xysmatodoma melanella*. Haw., according to Vollenhoven, and by Warren from the same on June 18th.

3. *Ascogaster rufipes*, Latr.

Sigalphus rufipes, Latr., Gen. Crust. et Ins., iv., 14 ♂.
Chelonus rufipes, Nees, Mon., i., 283; Ratz., Ichn. d. Forst., ii., 24, ♂ ♀.
Ascogaster rufipes, Reinh., Berl. ent. Zeit., 1867, p. 365; Thoms., Opusc. Ent., vi., 1874, p. 583, ♂ ♀.
A. bidentulus, Wesm., Nouv. Mém. Ac. Brux., 1835, p. 230, ♀.
Chelonus multiarticulatus, Ratz., Ichn. d. Forst., iii., 25.
C. pallipes, Schäff., F. G., cliv.

Black; ♂ with the antennæ beneath, mouth, and legs, rufo-testaceous; hind coxæ at the base, hind tibiæ at the apex, and their tarsi, fuscous, these last whitish at the base; trochanters rufo-testaceous. ♀ with the basal half of the antennæ, mouth, anterior femora and tibiæ for the most part, and hind tibiæ at the base, rufo-testaceous; hind tarsi whitish at the base. Head thickly punctulate; clypeus indiscrete, angulated and bidenticulated at the apex. Mesothorax rather shining, punctulate; pleuræ punctato-rugulose; metathorax truncate, quadridentate. ♂ ♀. Length, $1\frac{3}{4}$—2; wings, $3\frac{1}{2}$—4 lin.

Var. ♀. Abdomen testaceous at the base; legs as in the ♂.

Antennæ ♂ ♀ 30—35-jointed. Head covered with whitish pubescence. Palpi whitish. Mesothoracic sutures irregularly crenulate. Wings hyaline, with a distinct fuscous cloud under the stigma, before which is a whitish streak.

Common. Bred by Elisha from *Stigmonota Leplastrierana*, Cur., and *Coleophora gryphipennella*, Bouché, both on July 31st. By Bignell from a *Tortrix*. By W. H. B. Fletcher, seven males, from *Coccyx ustomaculana*, Cur., July 5th. By Brischke from *Earias chlorana*, L., and *Tortrix podana*, Scop., on willows; also from *Teras Holmianum*, L., and *Hyponomeuta padellus*, L.; in his 'Wirths-tabelle' it is mentioned as a parasite of *Selandria tenella*, Kl. By Bouché, according to Ratzeburg, from "*Tortrix funerana*," not in the lists (? *Anesychia funerella*, Fab.). Ratzeburg also mentions the remarkable occurrence of two of these Ascogasters in one cocoon found in a larva of *Emydia cribrum*, L., while a second cocoon from the same victim produced a *Microgaster* (iii., 24, 47). The cocoon is white and pellucent, like gold-beater's skin.

4. *Ascogaster elegans*, Nees.

Chelonus elegans, Nees, Mon., i., 287, ♂.
Ascogaster elegans, Reinh., Berl. ent. Zeit., 1867, p. 366, ♂ ♀.

Black, antennæ sometimes at the base beneath, palpi, basal third of the abdomen, and legs, rufo-testaceous, including the coxæ and trochanters; hind coxæ at the base above, 4 posterior tibiæ at the apex, with their tarsi, black. Head rugulose, clypeus not discrete, angulated at the apex. Mesothorax and pleuræ thickly reticulato-rugulose; metathorax obliquely descending at half its length, rugose, bidentate. ♂ ♀. Length, 2; wings, $3\frac{1}{2}$ lin.

I have not seen the ♂. According to Nees and Reinhard the antennæ of the ♂ are wholly black, of the ♀ testaceous at the base beneath. Those of the British ♀

specimen are, however, entirely black, 36-jointed, slightly incrassated before the apex. Nees states the metathorax to be 4-dentate; according to Reinhard, and in the British example, it is 2-dentate. Nees says that all the coxæ are rufo-testaceous; Reinhard that the hind coxæ are black at the base above; in the British specimen all the coxæ are so coloured. These discrepancies, and the want of more specimens, render the identification uncertain. The insect agrees, however, very well with Reinhard's description.

One ♀ taken by Bridgman; Brundall, Norfolk, July 3rd.

5. *Ascogaster rufidens*, Wesm.

Ascogaster rufidens, Wesm., Nouv. Mém. Ac. Brux., 1835, p. 231, ♂; Reinh., Berl. ent. Zeit, 1867, p. 365; Thoms., Opusc. Ent., vi., 1874, p. 584, ♂ ♀.

Chelonus rufipes, Schäff., F. G., cliv. (not Latr.).

C. lævigator, Ratz., Ichn. d. Forst., iii., 25.

Black, antennæ ♀ on their basal half (of the ♂ only beneath), mandibles, palpi, and legs, rufo-testaceous; coxæ black, trochanters rufo-testaceous; tarsi, hind femora, and tibiæ, fuscous in the middle. Head finely and thickly punctulate, clypeus hardly discrete, angulated in front and subtridentate. Mesothorax and pleuræ rather shining, strongly punctured. Metathorax bidentate, Mesothoracic sutures distinct, crenulate. ♂ ♀. Length, 1¾—2; wings, 3½—4 lin.

Var. The fuscous colour on the legs more or less obsolete.

Described from 27 specimens. Antennæ ♂ ♀ 32—34-jointed. Face covered with white pubescence, faintly carinated above. Mandibles testaceous. Mesothorax punctate, in the middle rugose with confluent punctures. Scutellum shining, punctulate. Metathorax reticulato-rugose. Abdomen bicarinated at the base. Wings slightly tinted, but not with a distinct fuscous cloud, as in *rufipes*.

Common. Bred by Fitch from *Arctia caia*, L., June 30th; by Elisha from *Telcia vulgella*, Hüb., July 31st; by Bignell from *Gracilaria syringella*, Fab., July 26th. Taken in Scotland by Cameron and bred by him on July 1st from *Andricus terminalis* gall. Ratzeburg's *lævigator* is said by Brischke to be a parasite of *Saperda populnea*, L., and obtained from excrescences on *Populus* *tremula* inhabited by that longicorn; also bred by Brischke from *Laverna Hellerella*, Dup. Cocoon white, pellucent, like that of *A. rufipes*.

6. *Ascogaster Ratzeburgii*, n. s.

Niger, palpis fuscis; trochanteribus, femoribus tibiisque anterioribus, rufo-testaceis, illis basi, his apice, latius fuscis; tarsis etiam fuscis. Caput rugulosum, clypeo non discreto, antice angulato. Thorax totus cum pleuris confertim reticulato rugosus; metathorax edentatus. Alæ leviter infuscatæ; areola radialis brevis, stigmati æqualis; radii abscissa tertia regulariter curvata; nervus recurrens in areolam cubitalem primam rejectus.

Black, palpi fuscous; trochanters, anterior femora and tibiæ, rufo-testaceous, the base of the former and the apex of the latter, broadly fuscous; tarsi fuscous. Head rugulose, clypeus indiscrete, angulated in front. Thorax and pleuræ thickly reticulato-rugose; metathorax unarmed. Wings slightly infuscated; radial areolet short, of the same size as the stigma; 3d abscissa of the radius regularly curved; recurrent nervure rejected. ♂. Length, 2; wings, 3½ lin.

Antennæ somewhat longer than the body, 34-jointed, entirely black. Mandibles rufous. Face covered with white pubescence; front carinated, and with the usual shallow fovea above the antennæ immarginate. Hind legs wholly black, except the trochanters. Radial areolet not elongate and acuminated as in other species, but the 3d abscissa of the radius regularly curved throughout its length, as in *Microctonus*.

One ♂ taken by Bridgman, July 3rd, at Brundall, Norfolk, at the same place and time as *A. elegans*, Nees; but the two insects are abundantly distinct.

7. *Ascogaster variipes*, Wesm.

Ascogaster varipes,* Wesm., Nouv. Mém. Ac. Brux., 1835, p. 234, pl. ii. (wing); Reinh., Berl. ent. Zeit., 1867, p. 366; Thoms., Opusc. Ent., vi., 1874, p. 587, ♂ ♀.

Black, fore femora at the apex, fore tibiæ entirely, middle and hind tibiæ at the base, rufo-testaceous; trochanters black. Mesothoracic sutures obsolete. Head thickly punctate, clypeus discrete, rounded in front, not tridentate. Mesopleuræ and metathorax reticulato-rugose, the latter truncate, bidentate. Abdomen ♀ sometimes testaceous at the base. ♂ ♀. Length, 1¾—2; wings, 3½—4 lin.

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* The Latin *varus*, "crooked," is confounded with *varius*, "diversified," in too many entomological names, and is likely to mislead those who expect to find a meaning in descriptive epithets.

Antennæ 33—35-jointed. Face feebly carinated. Thorax and scutellum granulated; mesothoracic sutures obliterated. Wings slightly tinted. The black trochanters distinguish this from all the preceding species.

One ♂ taken in Epping Forest, and another by Bridgman in Workhouse Lane, Norwich, July 6th.

8. *Ascogaster bicarinatus*, Schäff.

Chelonus bicarinatus, Schäff., F. G., cliv., 10. c. ♀.
Ascogaster bicarinatus, Reinh., Berl. ent. Zeit., 1867, p. 368, ♀.

Black, palpi dusky; anterior femora at the apex, fore tibiæ entirely, and hind tibiæ at the base, rufo-testaceous; trochanters black. Head buccate, punctato-rugulose; clypeus scarcely discrete, rounded, bidenticulate. Mesothorax and pleuræ thickly punctulate, somewhat shining. Metathorax reticulato-rugulose, with 2 carinæ diverging in the middle; obtusely bidentate. ♂ ♀. Length, 1¾; wings, 3½ lin.

Antennæ ♂ much longer than the body, 36-jointed. Those of the original ♀ example of Herrich-Schäffer, examined by Reinhard, were broken, but 24 joints remained. I have not seen the ♀. Face carinated; viewed from above the carina appears like a small spine. Wings infuscated; recurrent nervure interstitial. In one ♂ the base of the abdomen is obscurely rufescent; in another the 2d suture is indicated by a transverse depression. Closely allied to *variipes*, but the clypeus is toothed in front, and the antennæ of the ♂ longer. From *armatus*, Wesm., it differs in the finer sculpture, the toothed clypeus, and the shallower, immarginate, less shining frontal excavation.

Two males taken in Leicestershire, and one in Herts.

9. *Ascogaster armatus*, Wesm.

Ascogaster armatus, Wesm., Nouv. Mém. Ac. Brux., 1835, p. 233; Reinh., Berl. ent. Zeit., 1867, p. 363, ♂ ♀.
Chelonus luteicornis, Schäff., F. G., cliii., 8, ♂ ♀.

Black, palpi black, base or basal half of the antennæ, 4 anterior femora at the apex, fore tibiæ entirely, 4 posterior tibiæ at the base, rufo-testaceous or rufo-piceous; trochanters black; abdomen

♂ sometimes obscurely rufescent at the base, of the ♀ rufo-ferruginous with the apex black. Head broad, rugulose, buccate, front with a deep, shining, fovea margined on each side; clypeus discrete, rounded, edentate. Mesothorax, pleuræ, and metathorax reticulato-rugose, the last bidenticulate. ♂ ♀. Length, 2½; wings, 3½ lin.

Among the four species with black trochanters this may be known at once by the mesothorax not being punctate, but rugose, and by the smooth, deep, margined, frontal fovea. Antennæ ♂ rather longer than the body, 36-jointed (in one specimen); those of the ♀ shorter, thickened beyond the middle, 37—38-jointed. In the only British example, which is a ♂, joints 1—3 are testaceous, with a fuscous line above; and the palpi are not black, but dingy testaceous. The abdomen is entirely black, as in the ♂ described by Wesmael.

The specimen is in Bridgman's collection, and was taken at Buckenham, Norfolk, August 17th. It is accompanied by a broken example, which was named by Reinhard, in Fitch's collection.

10. *Ascogaster quadridentatus*, Wesm.

Ascogaster quadridentatus, Wesm., Nouv. Mém. Ac. Brux., 1835, p. 237; Reinh., Berl. ent. Zeit., 1867, p. 367; Thoms., Opusc. Ent., vi., 1874, p. 588, ♂ ♀.

Chelonus similis, Ratz., Ichn. d. Forst., i., 42, pl. vii., f. 16 (not of Nees).

C. impressus, Schäff., F. G., cliii., 9.

C. quadridens, Schäff., F. G., cliv., 10.

Black, antennæ at the base, fore tibiæ, fore femora at the apex, posterior tibiæ often at the base narrowly, rufo-testaceous. Head finely rugulose, clypeus hardly discrete, angulated at the apex, not tridentate. Mesothoracic sutures obsolete. Mesothorax, mesopleuræ, and metathorax reticulato-rugose, the last 2—4-dentate, ♂ ♀. Length, 1¾—2; wings, 3½—4 lin.

Var. ♂ ♀. Antennæ entirely black; of the ♀ 33-jointed.

Antennæ ♂ 29—30-jointed, 1st joint black tipped with testaceous, the following joints also testaceous, especially on the under side, becoming darker to the middle, the rest black. Face covered with short ashy pubescence, having a fine medial carina reaching from near the clypeus to the ocelli. Clypeus minutely angulated in the middle, the angle somewhat raised. Mandibles black, sometimes testaceous at the points; palpi testaceous or dusky. Metathorax armed with 4 strong teeth, 2 lateral, and 2 shorter, intermediate. Wings very slightly tinted, with traces of a decolorous line below the blackish stigma; 2d cubital areolet broader and shorter than in *variipes*, receiving the recurrent nervure near its base. Antennæ ♀ 34-jointed, wings more distinctly tinted near the stigma. One ♀ described by Wesmael had the recurrent nervure interstitial in one wing, and evected in the other.

Of 11 British specimens, 10 belong to the variety with black antennæ, and nine are females. One ♀ was bred June 25th from *pupa* of *Endopisa nigricana*, Ste., at Worcester by J. E. Fletcher; another from galls of *Cynips Kollari*, Hart., and a third from *Eupithecia absinthiata*, L. These are in Fitch's collection. Reared by Ratzeburg from *Hedya ocellana*, Fab., when in 1839 that *Tortrix* was the pest of German apple trees. Bred by Von Heyden, according to Reinhard, from *Carpocapsa splendidana*, Hüb. By Goossens, according to Giraud, from *Pardia tripunctana*, Fab. Brischke reared it from *Tortrix rosana*, L., *heparana*, Schiff., *Dictyopteryx Bergmanniana*, L., *Pædisca Solandriana*, L., *Opadia funebrana*, Tr., *Endopisa nigricana*, Ste., and other *Tortricidæ*; also from *Hyponomeuta padellus*, L., *malinellus*, Zell., *Laverna Hellerella*, Dup.; from a sawfly, *Nematus leucostictus*, Hart., and a dipteron (?) *Anthomyia albimana* (perhaps *Heteroneura albimana*, Meig., which, however, is far removed from *Anthomyia*). Captured by Curtis at Shotover, near Oxford; by me in Northants, one male, three females; by Fitch at Hastings and Maldon; near Guildford, by Capron; and at Headley Lane, by Billups. *Chelonus impressus*, Schäff., was so named from an accidental impression marking one of the abdominal sutures.

iv. SPHÆROPYX, *Hal.*

Hal., Ent. Mag., i., 266 (1833); *Rhitigaster*, Wesm., Nouv. Mém. Ac. Brux., 1835, p. 247.

Abdomen with two visible sutures; lateral margins not reflexed; beneath with two teeth, pointing backwards. Mesothoracic sutures distinct. Intermediate tibiæ simple. First cubital areolet distinct from the prædiscoidal. Recurrent nervure rejected. Præ- and pobrachial areolets subequal. Terebra subexserted, obtuse, ensiform.

This genus is placed last in the subfamily, as serving to connect the *Chelonides* with the *Microgasterides* and

Agathidides. The abdomen, though tending to lose the form of a carapace, still shows a similiarity to that of *Chelonus*; the 1st segment, thorax, and head, are like those of *Agathis*; the terebra and its valves are formed as in *Microgaster.* There seems to be no reason why the name *Sphæropyx* of Haliday should be neglected in favour of Wesmael's wrongly spelt *Rhitigaster*, which is of later date. The subgenus *Acampsis*, Wesm., formed for the reception of *Chelonus alternipes*, Nees, differs from *Sphæropyx* in that a portion of the 4th abdominal segment is visible; but the character is not of generic value, and the species is not British.

1. *Sphæropyx irrorator*, Fab. (Pl. V., fig. 3).

Ichneumon irrorator, Fab., E. S., ii., 177; *cf.* DeGeer, Mém. I., iv., 29, pl. xxxvi., ff. 12, 13.

Chelonus irrorator, Nees, Mon., i., 276, ♀; Ratz., Ichn. d. Forst., iii., 25.

Rhitigaster irrorator, Wesm., Nouv. Mém. Ac. Brux., 1835, p. 248, ♂ ♀; Thoms., Opusc. Ent., vi., 1874, p. 555; St. Farg., Hym., pl. xliv., f. 4; S. v. Voll., Schets., ii., tab. 5 (♀ and ♂ abdomen).

Black, with whitish pubescence; segment 3 aureo-sericeous; legs hirsute, fore femora at the apex, and their tibiæ on one side, testaceous; middle tibiæ dull testaceous at the base; hind tibiæ testaceous with black tips. Wings subhyaline towards the base, the apical half fuscous; stigma ferruginous; beneath it is a whitish spot. Metathorax rugose, canaliculated. Abdomen showing 3 segments, rugose, clavate. Terebra very short. ♂ ♀. Length, 4—5; wings, 8—10 lines.

Antennæ about as long as the body, 50-jointed. Head narrower than the thorax; clypeus deeply impressed on each side at the base; face carinated. Mesothoracic sutures distinct, the 2 lateral much deeper than the middle one. Before the smooth scutellum are two deep impressions. Metathorax shining, rugose, canaliculated in the middle. Abdomen longer than the head and thorax, gradually widened to the apex; segments 1—2 rugose, dull; segment 1 bidenticulate at the base, bicarinated, the carinæ continued upon segment 2, but more faintly; segment 3 very convex, less rugulose, and covered above with adpressed hairs, forming a golden sericeous spot. Belly concave, carinated in the middle, armed just behind the terebra with 2 acute teeth pointing backwards.

Var. Segment 2 blood-red with abbreviated black band; Wesm., *l. c.*, 1838, p. 166.

A solitary parasite of *Noctuæ*, mostly found in southern and central Europe, but also known in Sweden and Holland; taken by Dahl at Vienna, and by Wesmael at Brussels, Liége, &c. First bred by DeGeer from *Acronycta psi*, L. Subsequently, according to Ratzeburg, by Bouché from *Hadena pisi*, L.; by Drewsen and Boie from *Acronycta psi* on June 10th; by Brischke, July 8th, from *Acronycta tridens*, Schiff.; S. v. Vollenhoven records it as several times reared in Holland from *A. tridens*; and Giraud bred it in France from the same host. Introduced into the British list, perhaps wrongly, by Curtis (Guide, 2d ed., column 120); but it was not in his collection. Five specimens in Walker's collection at Oxford, ticketed *R. irrorator*, are nothing but *Ascogasters*; judging at least from the one kindly lent us by the Professor of Zoology, which was determined by Fitch and verified by me. Stephens, in his 'Catalogue,' records the species as British, and taken by himself in the London district, but no recent captures have occurred. Our figure is drawn from a foreign example in the British Museum. Cocoon 5 lines long, hard, white, and elliptical.

III. AREOLARII.

XI. MICROGASTERIDES.

Clypeus entire; mouth closed. Maxillary palpi 4—5-, labial 3-jointed. Vertex short, occiput seldom margined. Mesothoracic sutures obsolete. Abdomen sessile or subsessile, sutures distinct. Cubital areolets 2 or 3; in the latter case the 2d is minute, subtriangular or stirrup-shaped, often imperfect; radial areolet ample, nearly reaching the apex of the wing; exterior nervures, and especially the radial, more or less attenuated and obsolete; recurrent nervure rejected (except in *Acœlius*); pobrachial areolet longer than the præbrachial (except in *Acœlius*). Terebra subexserted or elongate.

The number of joints in the antennæ is invariable in each genus, and the same in both sexes. The abdomen above exhibits usually 8 segments (in *Mirax* 7, in *Acœlius* 5). The 1st consists, as in *Bracon*, of a hard, variously shaped scutum, with soft membranaceous edges, generally pale-coloured, and not always visible, being shrunk up in dead specimens. The last segment is very minute. In the ♀ the subapical ventral segment is more or less carinated and acutely produced, forming a fulcrum to support the terebra, and called the *valvula ventralis*. The anterior ventral segments, like those of *Bracon*, are membranaceous, often pale and pellucid. The hind coxæ are incrassated, elongate, approximate, and obliquely inserted.

The *Aréolaires* of Wesmael consisted of this subfamily together with the *Agathidides*, both distinguished by the minute 2d cubital areolet, resembling that of the true Ichneumons. The *Agathidides* are known at once by their narrow triangular radial areolet. Latreille's genus *Microgaster*, co-extensive with this group, was first subdivided by Nees von Esenbeck into two sections, founded upon the completeness or imperfection of the areolet. The last species, however, of his 2d section, *M. rugosus*, belongs to the *Agathidides*, genus *Orgilus*. Haliday and Wesmael worked upon the same lines as Nees. Ratzeburg attempted some further divisions, also based upon the characters of the areolet, but too minute and uncertain to be generally acceptable. The arrangement here adopted is that of Förster, confirmed and illustrated by Reinhard. *Mirax* and *Acœlius* are aberrant genera discovered by Haliday.

Table of Genera.

(2) 1. Antennæ 20-jointed; præ- and pobrachial areolets of equal length .. .. ii. Acœlius.

(1) 2. Antennæ with less than 20 joints; pobrachial areolet longer than the præbrachial.

(4) 3. Antennæ 14-jointed .. .. i. Mirax.

(3) 4. Antennæ 18-jointed.

(6) 5. Wings with 2 cubital areolets (the 2d being confused with the 3d) .. .. iii. Apanteles.

(5) 6. Wings with 3 cubital areolets (the 2d being more or less complete).

(8) 7. Spurs of the hind tibiæ shorter than ½ the metatarsus; segments 2, 3 not or hardly impressed with a transverse furrow .. .. .. iv. Microplitis.

(7) 8. Spurs of the hind tibiæ longer than ½ the metatarsus; segments 2, 3 impressed with a transverse furrow .. .. v. Microgaster.

i. Mirax, *Hal.*

Hal., Ent. Mag., i., 263; ii., 230 and 467.

Maxillary palpi 4-, labial 3-jointed. Antennæ 14-jointed. Eyes somewhat villose. Abdomen showing 7 segments above, 6 beneath, smooth and shining. Radius of the fore wings hardly inchoate, springing from the same point in the stigma as the 1st intercubital; two cubital areolets, the 2d imperfectly separated from the radial. Terebra subexserted.

1. *Mirax spartii*, Hal. (Pl. V., fig. 4).

Mirax rufilabris, Hal., Ent. Mag., ii., 230, ♀; S. v. Voll., Schets., II. Braconiden, tab. vi., wings, drawn by Haliday.

M. spartii, Hal., *lib. cit.*, 467; Ruthe, Berl. ent. Zeit., 1858, p. 7, ♀.

Black; head rufo-castaneous with a black spot on the vertex; abdominal segments 1—2 pale yellowish; legs ferruginous; wings hyaline, yellowish at the base, stigma fuscous with the extreme apex pale. ♀. Length, 1; wings, 2½ lin.

Head transverse, as broad as the thorax, covered with whitish pubescence; eyes green, small, minutely and thinly villose. Antennæ scarcely shorter than the body, slender, blackish, with the pedicel rufescent; scape ovato-cylindrical; 3d joint of the flagellum longer than the scape, the others decreasing in length to the apex. Mandibles triangular, bifid. Thorax ovate, depressed; mesothorax smooth, sericeous, with fine whitish pubescence; metathorax and abdomen smooth and shining, the latter as long and as broad as the thorax, ovato-orbicular, subdepressed, anterior segments equal, posterior short, transverse; scutum of the 1st segment very narrow (more so than in *Apanteles lateralis*, Hal.), elevated, attenuated at the apex, membranaceous margins broadly visible; valvula ventralis carinated, produced. Terebra subexserted. Wings hyaline, nervures pale fuscous, squamulæ fusco-ferruginous.

First taken, in some numbers, by Haliday, on *Spartium scoparium*, the common broom; but its association with this plant seems to have been accidental. Now known to be a parasite of *Nepticula septembrella*, Stainton, which mines the leaves of *Hypericum perfoliatum*, St. John's wort. Fitch bred a specimen from this source on June 7th, and W. H. B. Fletcher, of Worthing, about a dozen in May and June, all females.

ii. ACŒLIUS, *Hal.*

Adelius, Hal., Ent. Mag., i., 262 (1833); *Acœlius*, Hal., *lib. cit.*, ii., 231.

Maxillary palpi 5-, labial 3-jointed. Antennæ 20-jointed, the scape elongate. Eyes villose. Occiput contracted, finely margined. Vertex prolonged behind the ocelli. Abdomen broad, sessile, shorter than the thorax, showing 5 segments above, 6 beneath, smooth and shining; segment 1 as long as 2—5 taken together, not scutated. Radius of the fore wings subobsolete, isolated, springing from a point remote from the 1st intercubital; two cubital areolets, the 2d imperfectly defined, all the exterior nervures being obsolete. Terebra subexserted.

The prolongation of the vertex makes the head appear, from above, subhemispherical. The præ- and pobrachial areolets are of equal length; recurrent nervure subinterstitial; stigma large and rounded, instead of triangular. Metathorax bidenticulate. Tibiæ subclavate, rounded at the apex; in the other genera they are truncate. In addition to Haliday's species seven are described by Förster, Verh. pr. Rheinl., 1851, pp. 30—38, and one by Ruthe, Berl. ent. Zeit., 1858, p. 4. Unlike other *Microgasters*, they run with great rapidity. In size and colours they are variable; in structure uniform.

1. *Acœlius subfasciatus*, Hal. (Pl. V., fig. 5).

Acœlius subfasciatus, Hal., Ent. Mag., ii., 232, ♂ ♀; S. v. Voll., Schets., II. Braconiden, tab. iv.
Adelius subfasciatus, Wesm., Nouv. Mém. Ac. Brux., 1837, p. 68, pl. (wing), ♂ ♀.
Pleiomerus subfasciatus, Ratz., Ichn. d. Forst., iii., 65, fig.
Var. *Acœlius germanus*, Hal., Ent. Mag., ii., 232, ♂ ♀. (Fore legs, and sometimes the face, coxæ, and trochanters, testaceous. Length, $\frac{3}{4}$ lin.).

Black; mandibles, palpi, fore tibiæ at the base and apex, 4 anterior tarsi, and apex of the trochanters, fusco-testaceous or piceous. Wings whitish, with two more or less distinct dark bands, separated by a whitish interval below the fuscous stigma; most of the nervures decolorous. Head and thorax minutely punctulate, dull; abdomen shining. Terebra subexserted. ♂ ♀. Length, $\frac{1}{2}$—$\frac{3}{4}$; wings, $1\frac{1}{6}$—$1\frac{3}{4}$ lin.

Antennæ ♂ ♀ longer than the body, those of the ♀ incrassated in the middle, of the ♂ longer, attenuated towards the apex. Thorax minutely punctulate; metathorax elongate, subrugulose, bidenticulated, not much lower than the scutellum. Legs stout, 4 posterior femora and hind tibiæ incrassated, the latter clavate. Calcaria shorter than $\frac{1}{2}$ the metatarsus. The dark fasciæ on the wings are variable, and often obsolete.

In a MS. note by Haliday, accompanying his types preserved in the British Museum, *A. germanus* and *subfasciatus* are united into one species. This is no doubt correct, and also in accordance with the views of Ratzeburg. Haliday was acquainted with very few specimens, which he found on willows, and regarded as rare. They have since proved to be everywhere common parasites of *Tineidæ*, and especially, as it would seem, of *Nepticula*. Nearly 50 have been bred by W. H. B. Fletcher, of Worthing, mostly in May, from *Nepticula poterii*, Staint., *anomalella*, Göze, *Weaveri*, Dougl., *trimaculella*, Haw., *marginicolella*, Staint., *salicis*, Staint., *basiguttella*, Hein., *filipendulæ*, Wocke, *plagicolella*, Staint., and others; also from *Coccyx ustomaculana*, Cur. (?), *Coleophora ahenella*, Wocke, and *Lithocolletis alnifoliella*, Hüb. Elisha has obtained them from *Ornix scoticella*, Staint., or *Nepticula aucupariæ*, Frey., and *Lithocolletis Schreberella*, Fab.; the last was prematurely forced on March 14th. A very different origin is assigned to them by Ratzeburg, according to whom Brischke reared them from the galls of *Cecidomyia rosaria*, Loew, on *Salix alba* and *fragilis*.

iii. APANTELES, *Först.*

Först., Verh. pr. Rheinl., 1862, p. 245; Reinh., Berl. ent. Zeit., 1880, p. 361.

Maxillary palpi 5-, labial 3-jointed. Antennæ 18-jointed. Eyes villose. Mesopleuræ impressed with a smooth fovea. Abdomen sessile; suturiform articulation distinct. Radius of the fore wings subobsolete; 2 cubital areolets, the 2d being open on the outer side, and thus confused with the 3d. Spurs of the hind tibiæ never much shorter than ½ the metatarsus.

The total absence of the outer side of the areolet distinguishes this genus from *Microplitis* and *Microgaster*; it differs also from *Microplitis* in the more developed spurs of the hind tibiæ; and from *Microgaster*, in that the 2d abdominal suture is not marked by any transverse depression. To the genus *Apanteles* belong most of the Microgasterides, the natural enemies of Lepidoptera, no single species of which, in temperate climates, seems to be free from their attacks. In the tropics, however, their place is taken by the multitudinous forms of *Agathis* and its allied genera. A few species have been recorded as parasites of other orders than Lepidoptera. Among the Coleoptera, *Rhynchites betuleti*, Fab., and *Lina tremulæ*, Fab., have been found to be infested by *Apanteles hoplites*, Ratz.; *Orchestes quercus*, L., by *A. breviventris*, Ratz.; *Anthonomus pomorum*, L., by *A. impurus*, Nees, and *A.*

lacteus, Nees; and *Hypera variabilis*, Hbst., by *A. sericeus*, Nees. *A. breviventris*, Ratz., has been reared from the hymenopterous *Andricus terminalis*, Fab.; and in the Mayr collection at Vienna, according to Reinhard, is a series of *A. albipennis*, Nees, bred from *Andricus multiplicatus*, Gir. *A. lineola*, Hal., has without doubt been reared from the larva of a dipterous insect, *Syrphus pyrastri*, L.; and *A. scabriculus*, Reinh., probably from the galls of *Cecidomyia rosaria*, Loew. *A. ultor*, Reinh., by Brischke from the larva of a *Chrysopa*. Reinhard, who has collected most of the above notices, is of opinion that as the greater part of these parasites have also been bred from Lepidoptera, the observations connecting them with other orders require further confirmation. For example, *Andricus multiplicatus*, Gir., makes galls which are abundantly infested by a moth, and it is much more likely that *A. albipennis*, Nees, is parasitic upon this than upon the *Cynips*. Similarly *A. ensiformis*, Ratz., issuing from the galls of *Rhodites rosæ*, L., is not thereby proved to be a parasite of that *Cynips*. The references to economy in Dours' Catalogue have not been copied, as the determinations of the species by Perris or Goureau are unreliable. The maggots of *Apanteles* are themselves subject to the attacks of hyperparasites, belonging to the Ichneumonideous genera *Hemiteles*, *Pezomachus*, and *Mesochorus*, as well as to the family *Chalcididæ*; some instances of this we shall have occasion to notice hereafter. The fine silk cocoons spun by the larvæ of *Apanteles* are well-known objects, and of great use in the difficult task of determining species. They are either white, yellow, or buff-coloured, and often protected by an external web enveloping the whole brood, except in the case of the solitary species; in a few instances they are arranged in an alveariform mass, which always denotes that their victim was a geometrical larva. Roughly speaking, we may lay it down as a rule that all the species with a long terebra (Sect. II.) make white cocoons; as also those of Sect. IV. Yellow cocoons belong to comparatively few species, of Sect. I. and III. Buff-coloured cocoons are perhaps limited to two or three species, as *A. juniperatæ*, Bouché, and *difficilis*, Nees.

Haliday, in the Ent. Mag., 1834 (ii., pp. 242—254), described 33 species of this genus, while the number contained in the present work is 69. This increase is due to the large supply of materials, mostly bred specimens, kindly contributed by many lepidopterists, to whom we cannot sufficiently express our obligations. Among these gentlemen we must specially mention Bignell, whose whole collection, considerable in numbers and admirable for its careful preparation, has long been in our hands for examination. Reinhard's valuable papers in the Berl. ent. Zeit. (1880—81) have done much to facilitate the study of this genus. They contain a systematic revision of 59 species brought together from the works of Haliday, Nees, Bouché, Wesmael, and Ratzeburg. Of these 49 are here introduced as British. To these are to be added 8 indigenous species described by Haliday, but not known to Reinhard; all these have been identified, with the exception of *lineola*. *A. perspicuus*, *analis*, *sericeus*, Nees, and *caiæ*, Bouché, have likewise been verified, and several new species discovered.

A synopsis of the species will be more intelligible if we first divide them into sections, and then give a separate table for each.

Sect. I.—First abdominal segment subquadrate, seldom a little longer than broad, truncate behind. Segment 2 as long as 3, or nearly so. Terebra very short. Spp. 1—25.

Sect. II.—First abdominal segment as in Sect. I. (except *A. viminetorum*, Wesm., and *exilis*, Hal., where its length is about double its breadth), seldom a little narrowed behind. Segment 2 much shorter than 3. Terebra elongate, at least ¼ as long as the abdomen. Spp. 26—53.

Sect. III.—First abdominal segment about ½ longer than broad, rarely more subquadrate, truncated behind. Segment 2 never much shorter than 3, impressed with two oblique lines remote from the margins, converging to the base, and enclosing a subtriangular space. Terebra very short. Spp. 54—58.

Sect. IV.—First abdominal segment attenuated behind, rounded or lanceolate at the apex, at least twice as long as broad. Segment 2 not much shorter than 3, with two oblique impressed lines converging to the base, and enclosing a subtriangular space. Terebra variable. Spp. 59—69.

In Sect. II. the males of the species with a shorter terebra, and whose 2d segment is not so distinctly shorter than the 3d, are liable to be incorrectly referred to Sect. I.

In Sect. III. the impressed lines upon the 2d segment are not marginal or lateral, but discal. When the segment is only margined by impressed lines afterwards converging to the base, as in *glomeratus*, the species is referred to Sect. I.

In Sect. IV., when the 1st segment happens to be somewhat more broadly rounded than usual, care must be taken not to regard it as truncated.

With these unavoidable exceptions, the sections are sharply defined, and almost any species may be referred to its place with certainty.

TABLE OF SPECIES.

SECTION I. Segment 1 broad, truncated behind. Segment 2 as long as 3, or nearly so. Terebra very short.

(6) 1. Segment 3 rugulose, at least at the base.
(3) 2. Hind femora more or less testaceous, often edged with black or fuscous .. .. 1. *solitarius*,[*] Ratz.
(2) 3. Hind femora wholly black or fuscous.
(5) 4. Segments 1—2 carinated; length, 1½ lin. 3. *salebrosus*, n. s.
(4) 5. Segments 1—2 not carinated; length, 1 lin. .. .. 4. *tetricus*, Reinh.
(1) 6. Segment 3 smooth, or only sparingly and minutely punctulate.
(12) 7. Hind coxæ granulated, scarcely shining.
(9) 8. Fore coxæ testaceous .. .. .. 5. *ruficrus*, Hal.
(8) 9. All the coxæ black.
(11) 10. Belly broadly testaceous at the base .. 6. *ordinarius*, Ratz.
(10) 11. Belly black at the base, or with only a pellucid spot .. .. 7. *congestus*, Nees.
(7) 12. Hind coxæ smooth, shining, punctulate.
(18) 13. Legs, with the coxæ, entirely testaceous, or only the hind coxæ fuscous at the base.
(15) 14. Mesothorax rufous.. .. .. .. 8. *ferrugineus*, Reinh.
(14) 15. Mesothorax black.
(17) 16. Valvula ventralis surpassing the anus; antennæ not longer than the head and thorax; abdomen rufous, the segments margined with fuscous .. .. .. 9. *Bignellii*, n. s. ♀.
(16) 17. Valvula ventralis not surpassing the anus; antennæ as long as the body; abdomen black above, testaceous beneath and at the apex .. .. 10. *analis*, Nees, ♀.
(13) 18. Legs not wholly testaceous, at least the hind coxæ black.
(28) 19. Hind femora testaceous, often tipped with black.

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[*] Sp. 2, *lineola*, Hal., requires to be rediscovered, and is here omitted.

(21) 20. Segment 2 not carinated; hind femora not tipped with black .. .. 10. *analis*, Nees, ♂.

(20) 21. Segment 2, and often 3, with a shining medial carina; hind femora usually tipped with black.

(23) 22. Segments 1—2 distinctly edged at the sides with testaceous .. .. .. 11. *limbatus*, n. s.

(22) 23. Segments 1—2 not, or very narrowly, edged at the sides with testaceous.

(25) 24. Squamulæ dull testaceous .. .. 12. *rubripes*, Hal.

(24) 25. Squamulæ black.

(27) 26. Wings dusky hyaline; length, 1½ lin. (cocoons creamy white) .. .. 13. *rubecula*, n. s.

(26) 27. Wings limpid; length, 1⅕ lin. (cocoons sulphur-yellow) .. .. .. 14. *glomeratus*, L.

(19) 28. Hind femora black or fuscous, seldom testaceous on the sides.

(30) 29. Mesothorax and scutellum very shining, smooth, impunctate .. .. .. 15. *sericeus*, Nees.

(29) 30. Mesothorax and scutellum more or less shining, but always with some visible punctuation.

(32) 31. Segments 1—2 almost smooth; (length, ¾ lin.) .. .. 9. *Bignellii*, n. s. ♂.

(31) 32. Segments 1—2 rugulose.

(38) 33. Spurs of hind tibiæ slender, not longer than ½ the metatarsus.

(35) 34. Segment 2 not, or hardly, shorter than 3 16. *spurius*, Wesm.

(34) 35. Segment 2 more distinctly shorter than 3.

(37) 36. Stigma and nervures pale fuscous; length, 1 lin. .. .. 17. *Geryonis*, n. s.

(36) 37. Stigma black, nervures fuscous; length, 1½ lin. .. .. 18. *zygænarum*, n. s.

(33) 38. Spurs of hind tibiæ stout, longer than ½ the metatarsus.

(40) 39. Stigma pale at the base .. .. .. 19. *jucundus*, n. s.

(39) 40. Stigma unicolorous.

(44) 41. Wings dusky hyaline.

(43) 42. Ventral valve ♀ surpassing the anus; length, 1¼ lin. .. .. 20. *caiæ*, Bouché.

(42) 43. Ventral valve ♀ not surpassing the anus; length, 1½ lin. .. .. 21. *juniperatæ*, Bouché.

(41) 44. Wings limpid hyaline.

(50) 45. Segment 2 as long as 3.

(47) 46. Metathorax carinated; stigma rufo-testaceous .. .. 22. *gracilis*, Cur.

(46) 47. Metathorax not carinated; stigma fuscous or fuscescent.

(49) 48. Length, 1¼ lin. .. .. 23. *placidus*, Hal.

(48) 49. Length, ⅔ lin. .. .. 24. *nothus*, Reinh.

(45) 50. Segment 2 somewhat shorter than 3 .. 25. *difficilis*, Nees.

SECTION II. Segment 1 broad, truncated behind. Segment 2 much shorter than 3. Terebra elongate.

(18) 1. All the femora testaceous, hind pair sometimes edged with fuscous.

(9) 2. Fore coxæ, at least, testaceous.

(6) 3. Terebra as long as ¼ of the abdomen.

(5) 4. Stigma and nervures fuscescent, the former with a pale spot at the inner angle .. .. 26. *punctiger*, Wesm.

(4) 5. Stigma and nervures testaceous-yellow, the former unicolorous .. .. 27. *lætus*, n. s.

(3) 6. Terebra as long as the abdomen.

(8) 7. Antennæ entirely black .. .. 28. *adjunctus*, Nees.

(7) 8. Antennæ reddish beneath .. .. 29. *lictorius*, Reinh.

(2) 9. All the coxæ black.

(11) 10. Squamulæ testaceous .. .. .. 30. *falcatus*, Nees.

(10) 11. Squamulæ black.

(13) 12. Abdomen ♀ after segment 1 strongly compressed, cultrate; valvula ventralis considerably surpassing the anus .. .. 31. *cultrator*, n. s. ♀.

(12) 13. Abdomen ♀ not much compressed except at the apex; valvula ventralis not surpassing the anus.

(17) 14. Stigma unicolorous.

(16) 15. Mesothorax thickly punctulate, dull .. 32. *ultor*, Reinh.

(15) 16. Mesothorax hardly punctulate, sericeous, shining .. .. 33. *decorus*, Hal.

(14) 17. Stigma bicolorous .. .. .. 34. *dilectus*, Hal.

(1) 18. Hind femora black, sometimes pitchy at the sides or apex.

(22) 19. Stigma testaceous, pellucid.

(21) 20. Second abdominal segment smooth .. 35. *xanthostigmus*, Hal.

(20) 21. Second abdominal segment (like the 1st) rugulose .. .. 36. *contaminatus*, Hal.

(19) 22. Stigma more or less intensely fuscous.

(42) 23. First abdominal segment rugulose, dull.

(31) 24. Segment 2 distinctly rugulose.

(28) 25. Stigma bicolorous.

(27) 26. First abscissa of the radius curved, making no angle with the first intercubital nervure; length, 2 lines. .. 37. *prætor*, n. s.

(26) 27. First abscissa of the radius making an angle, as usual, with the first intercubital nervure; length, 1¼ lin. .. 38. *emarginatus*, Nees.

(25) 28. Stigma unicolorous.

(30) 29. Mesothorax, and pleuræ in front, thickly and rather strongly punctured; terebra about ⅔ of the abdomen .. .. 39. *obscurus*, Nees.

(29) 30. Mesothorax and pleuræ very finely punctulate, shining; terebra barely ¼ of the abdomen .. .. 40. *viminetorum*, Wesm.

(24) 31. Segment 2 smooth.

(37) 32. Wings milky-white or limpid hyaline.

(34) 33. Stigma testaceous, with a fuscous border 41. *sodalis*, Hal.

(33) 34. Stigma fuscous.

(36) 35. Stigma with a pale dot at the inner angle; segment 1 scarcely longer than broad; length, 1½ lin. .. .. 42. *albipennis*, Nees.

(35) 36. Stigma unicolorous; segment 1 longer by ½ than its breadth; length, 1¼ lin. 43. *impurus*, Nees.

(32) 37. Wings fusco-hyaline, or subhyaline.

(39) 38. Clypeus and face produced, rostriform (as in *Agathis*) .. .. .. 44. *naso*, n. s.

(38) 39. Clypeus and face of the usual form.

(41) 40. Segment 1 subquadrate; wings fusco-hyaline .. .. 45. *infimus*, Hal.

(40) 41. Segment 1 more than twice as long as broad; wings subhyaline .. .. 46. *exilis*, Hal.

(23) 42. First abdominal segment smooth, or hardly subrugulose at the apex.

(44) 43. Wings dark fuscous; hind legs entirely black .. .. 47. *gagates*, Nees.

(43) 44. Wings whitish, or subhyaline; hind legs partly testaceous.

(48) 45. Stigma testaceous, edged with fuscous, or testaceous at the inner angle.

(47) 46. Terebra as long as the abdomen .. 48. *Halidaii*, Marsh.

(46) 47. Terebra much shorter than the abdomen 49. *coniferæ*, Hal.

(45) 48. Stigma fuscous.

(50) 49. Hind femora black, with a longitudinal testaceous stripe .. .. .. 50. *lineipes*, Wesm.

(49) 50. Hind femora wholly black.

(52) 51. Terebra as long as the abdomen .. 51. *longicaudis*, Wesm.

(51) 52. Terebra shorter than the abdomen.

(54) 53. Terebra as long as ¼ abdomen .. .. 52. *fuliginosus*, Wesm.

(53) 54. Terebra as long as ½ or ⅔ abdomen .. 53. *sicarius*, n. s.

SECTION III. Segment 1 about ½ longer than broad, or subquadrate, truncated behind. Segment 2 not shorter, or not much shorter, than 3, impressed with two oblique lines, remote from the margins, converging towards the base, and enclosing a subtriangular space. Terebra very short.

(2) 1. Metathorax rugulose .. .. .. 54. *octonarius*, Ratz.

(1) 2. Metathorax smooth, or nearly so.

(4) 3. Segment 2 shorter than 3 .. .. 55. *abjectus*, n. s.

(3) 4. Segment 2 not shorter than 3.

(6) 5. Triangular enclosed space on segment 2 aciculated .. .. 56. *immunis*, Hal.

(5) 6. Triangular enclosed space on segment 2 smooth.

(8) 7. Segment 1 one-half longer than broad; four posterior femora testaceous, often with fuscous lines .. .. .. 57. *caberæ*, n. s.

(7) 8. Segment 1 hardly longer than broad, subquadrate; four posterior femora black .. .. 58. *popularis*, Hal.

SECTION IV. Segment 1 narrow, attenuated behind and rounded or lanceolate at the apex; at least twice as long as broad. Segment 2 not much shorter than 3, usually impressed with two oblique discal lines converging towards the base, and enclosing a subtriangular space. Terebra variable.

(14) 1. Segment 1 less than three times as long as its medial breadth.

(5) 2. Hind femora and tibiæ entirely or mostly black.

(4) 3. Segment 1 attenuated posteriorly from the middle; length, 1 lin. .. .. 59. *fraternus*, Reinh.

(3) 4. Segment 1 attenuated posteriorly from near the apex; length, 1¼ lin. .. 60. *triangulator*, Wesm.

(2) 5. Hind femora and tibiæ testaceous, or with only slight infuscations.

(7) 6. Metathorax carinated, rugulose .. 61. *pallidipes*, Reinh.

(6) 7. Metathorax not carinated, smooth, or finely punctulate.

(9) 8. Mesothorax punctulate .. .. .. 62. *bicolor*, Nees.

(8) 9. Mesothorax smooth.

(11) 10. Oblique impressions on segment 2 incomplete, not reaching the hind margin; length nearly 2 lines .. .. 63. *formosus*, Wesm.

(10) 11. Oblique impressions on segment 2 complete; length, 1 line or less.

(13) 12. Abdomen* testaceous with the apex black; terebra ⅕ of the abdomen; length, 1 lin. .. .. 64. *lautellus*, n. s.

(12) 13. Abdomen black, testaceous at the sides; terebra ½ of the abdomen; length, ¾ lin. .. .. 65. *umbellatarum*, Hal.

(1) 14. Segment 1 three times as long as its medial breadth, or longer.

(16) 15. Hind coxæ thickly punctured, dull . 66. *callidus*, Hal.

(15) 16. Hind coxæ finely punctulate, shining.

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* Except varieties, in which the black colour more or less predominates.

(20) 17. Hind femora and tibiæ tipped with fuscous; stigma fuscous; spurs of the middle tibiæ curved, not shorter than ½ the metatarsus.

(19) 18. Metathorax indistinctly punctulate at the sides; terebra ½ as long as the abdomen .. .. 67. *lateralis*, Hal.

(18) 19. Metathorax smooth; terebra very short 68. *vitripennis*, Hal.

(17) 20. Hind femora and tibiæ unicolorous, testaceous; stigma rufescent; spurs of the middle tibiæ straight, shorter than ½ the metatarsus .. .. 69. *fulvipes*, Hal.

SECTION I.

1. *Apanteles solitarius*, Ratz.

Microgaster solitarius, Ratz., Ichn. d. Forst., i., 73, ♂ ♀.
Apanteles solitarius, Reinh., Berl. ent. Zeit., 1880, p. 367, ♀.

Black, with black coxæ; palpi and legs testaceous, 4 posterior femora, and hind tibiæ at the tips, more or less black; belly at the base testaceous. Wings whitish hyaline, stigma fuscous. Mesothorax and pleuræ very finely punctulate, somewhat shining. Metathorax punctato-reticulate, subcarinated. First abdominal segment subquadrate, slightly narrowed towards the base; 2d transverse, a little shorter than the 3d; segments 1—2 rugulose, 3 subrugulose, but sometimes nearly smooth; 1—3 more or less obtusely carinated in the middle; the rest smooth and shining. Terebra very short. ♂ ♀. Length, 1½; wings, 3½ lin.

Abdomen flat above, beneath towards the apex subcompressed. The legs of the ♂ are more marked with black than those of the ♀; the hind femora may be all black, or only edged with that colour; the middle femora are usually black at the base; or the legs are entirely testaceous. Antennæ ♀ as long as the body; those of the ♂ longer.

Common. Bred by Bignell from *Orgyia antiqua*, L., *Tæniocampa miniosa*, Fab., *T. stabilis*, View., *Zonosoma punctaria*, L., and *Hybernia defoliaria*, L. A solitary parasite, attacking young larvæ, which perish at the beginning of summer, before they are half grown. One of Bignell's has preserved beside it a young larva of *T. stabilis*. Reared in Germany by Ratzeburg from *Psilura monacha*, L., and *Ocneria dispar*, L.; by Brischke and Giraud from the same, as well as from *Leucoma salicis*, L., and *Zonosoma linearia*, Hüb. Cocoon pale sulphur-yellow, fixed to a leaf, the sides of which are drawn together by a few threads, for its protection.

2. *Apanteles lineola*, Cur. (Hal.).

Microgaster lineola, Cur., B. E., 321, No. 11; Hal., Ent. Mag., ii., 252, ♂.

"Male. Thorax very minutely punctulate; femora and tibiæ flavo-testaceous; 4 posterior femora on both sides, and their tibiæ at the apex, fuscous; wings whitish; segments 1—3 aciculated."

"Size of *M. glomeratus*; palpi yellow; legs coloured nearly like those of *M. immunis*; stigma and nervures in the middle of the wing pale ferruginous, the rest decolorous; squamulæ black; metathorax punctato-reticulate; abdomen unusually short and broad, segments 1—3 punctato-reticulate; the 1st short, broad, its apical angles hardly margined with yellow."

I have not seen this insect, and the above is a translation of Haliday's description. It must be nearly allied to the preceding species, if not the same. Reinhard hesitated in joining them on account of their different habits, *lineola* having been bred from a dipterous insect, *Syrphus pyrastri*, L. As this fact appeared doubtful to Reinhard, I shall quote the words of Curtis in 'Farm Insects,' p. 81:—"The maggots" [of *S. pyrastri*] "are green, and I found them in July, 1829, in some abundance on the sea-cabbages, *Brassica oleracea*, which grow under the cliffs near Dover. Many of them had been stung by a little parasitic fly, called *Microgaster lineola*, the maggots of which came out of the *Scæva* larvæ, and formed little elliptical silken cocoons almost white." In 1884 I searched for the *Syrphus*-larvæ in the Isle of Wight, but could only obtain one, which produced a dipterous imago. These larvæ are grass-green, with a black dorsal stripe, common among Aphides on the south coast, and easily reared. It is to be hoped that some entomologist before long will obtain from them *A. lineola*. In Walker's collection, at Oxford, are two females and one male, numbered 104, ticketed *lineola*; but I have not been able to examine them.

3. *Apanteles salebrosus*, n. s.

Niger; palpis, femoribus anticis præter basin, mediis apice late, tibiisque omnibus, rufo-testaceis; tibiis posticis apice, tarsis iisdem basi, nigris. Ventris basis concolor. Alæ hyalinæ, squamulis, costa, stigmate, nervis, nigris. Caput et mesothorax crebre punctulata, nitidiuscula; scutellum lævius. Pleuræ parcius punctulatæ, nitidæ. Metathorax crasse reticulato-rugosus, nitidus, subcarinatus.

Abdominis segmentum 1um vix longius quam latius, basin versus paulo angustatum, marginatum, late truncatum; 2dum 3o æquale; segmenta 1—3 rugulosa, medio carinata, sed 3um apice læviusculum, carina minus elevata; cætera lævia, nitida. Terebra brevissima. Valvula ventralis anum non superans. Coxæ posticæ læves, nitidæ; calcaria metatarsis dimidio breviora, pallida.

Black; palpi, fore femora except at the base, middle femora at the apex broadly, and all the tibiæ, rufo-testaceous; hind tibiæ at the apex, their tarsi at the base, black. Belly at the base concolorous. Wings hyaline; squamulæ, costa, stigma, and nervures, black. Head and mesothorax thickly punctulate, somewhat shining; scutellum smoother. Metathorax coarsely reticulato-rugose, subcarinated, shining. Segment 1 hardly longer than broad, slightly narrowed towards the base, margined, broadly truncated; segment 2 as long as 3; segments 1—3 rugulose, carinated in the middle; 3 at the apex smoother, less strongly carinated; the rest smooth and shining. Terebra very short. Valvula ventralis not surpassing the anus. Hind coxæ smooth and shining; spurs of hind tibiæ shorter than ½ the metatarsus, pallid. ♀. Length, 1½; wings, 3¾ lin.

Not *carbonarius*, Wesm., which has the metathorax almost smooth, shining, strongly carinated; and the base of the belly pale. It is moreover ⅓ less in size. The *carbonarius* of Reinh. differs from that of Wesm. in having the metathorax reticulato-rugose, and so far resembles the present species; but the squamulæ are testaceous, the size smaller, and the 2d segment shorter than the 3d.

Two females were bred singly on June 30th by Bignell from larvæ of *Oporobia dilutata*, Bork., taken in Scotland. Cocoons lemon-yellow. With them may be compared *A. immunis*, Hal., reared from the same victims, and making similar cocoons, but in structure very different.

4. *Apanteles tetricus*, Reinh.

Apanteles tetricus, Reinh., Berl. ent. Zeit., 1880, p. 367, ♂ ♀.

Black; palpi pale; 4 anterior femora tipped with testaceous, tibiæ testaceous, the hind pair at the base only; belly at the base piceous. Wings iridescent, subinfuscated, stigma fuscous. Antennæ rather longer than the body. Mesothorax and pleuræ thickly punctulate, dull. Metathorax coarsely rugose. Segment 1 subquadrate, slightly narrowed at the base; segment 2 hardly shorter than 3, both rugose; 3d rugulose, more strongly at the base; the rest smooth. Terebra very short. ♂ ♀. Length, 1; wings, 2½ lin.

Minutely pubescent with pale hairs. Metathorax more coarsely rugose than usual. The rugosity of segment 3 varies in extent, and is sometimes confined to the base, never entirely absent.

Hitherto only noticed in Devonshire. Gregarious. Bignell reared two broods, of 6 and 7 respectively, from *Epinephele Ianira*, L.; and I found a batch of 30 cocoons attached to grass near Teignmouth. Very likely these were from *Zygæna filipendulæ*, L., the larvæ of which were feeding round about. Cocoons white, of coarse texture, irregularly piled, connected by a slight web. Brischke says, "from *Eupithecia exiguata*, Hüb.; cocoon single, yellow, rough," having apparently mistaken the species.

5. *Apanteles ruficrus*,* Hal.

Microgaster ruficrus, Hal., Ent. Mag., ii., 253, ♂ ♀.
Apanteles ruficrus, Reinh., Berl. ent. Zeit., 1880, p. 368, ♂ ♀.

Black; palpi testaceous; squamulæ, belly at the base, and legs, rufo-testaceous; hind coxæ more or less, and tips of the hind femora, black; hind tarsi, and often the tips of the hind tibiæ, fuscescent. Wings subhyaline, iridescent, stigma pale fuscous. Mesothorax and scutellum thickly punctate, dull; pleuræ the same, with a smooth space beneath the wings. Metathorax rugulose.

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* This is most probably the species of which Goureau gives us the life-history under the name *Microgaster globatus*, L.? (Ann. Soc. Fr., 1845, ser. 2, iii., pp. 355—361, pl. vii., ff. 1—5). It was parasitic on a full-fed Noctua-larva, thought to be *Hadena oleracea*, L., found feeding on the leaves of *Iris pseudacorus* on June 1st. The maggot is described as 4 mm. long and ⅔ m. in diameter, green, cylindrical, soft, footless, glabrous, attenuated anteriorly; head brown; mouth transverse, cartilaginous, at the extremity of a muzzle; upper lip trilobed, lower entire; two black ocular points upon the second segment; body consisting of 12 segments, those after the head furnished with lateral tubercles by the help of which the maggot escapes from the body of the victim. Sixty of these maggots emerged on June 5th, and spun white cocoons gregariously under a common web. The perfect insects appeared on June 14th, and were all dead by the 17th. In the larval state they live by suction upon the juices of the adipose tissue; the soft structure of the mouth being not adapted for tearing or masticating solid substances. Their fluid aliment is constantly secreted by the digestive powers of the caterpillar, which probably suffers little inconvenience, showing no other signs of disease than a voracious appetite and a somewhat retarded growth. Goureau's views upon this subject are

Segment 1 twice as long as broad, with parallel sides, truncate rugulose; 2 broader than 1, as long as 3, narrowed anteriorly, also rugulose; the rest smooth and shining. Terebra exserted, very short. Ventral valve somewhat surpassing the anus. Hind coxæ above rugulose, bristly. ♂ ♀. Length, 1¼; wings, 2½ lin.

Sometimes the apical half of the hind femora is infuscated. The abdomen of the ♀ is acuminate, with the terebra visibly protruding. The 3d segment is occasionally margined with rufous at the apex, or there are two rufous spots at the hind angles; examples of both have been taken by Bignell.

Common; gregarious. Bred by Bignell in May from *Leucania littoralis*, Cur.; and Sept. 7th, from *Spilosoma menthastri*, Esp., 24 specimens, which remained in pupa 10—14 days. By Raynor from *Leucania pallens*, L., 28 on a card, of which only 3 are males. In Fitch's collection is a card of 9 from *Collix sparsata*, Hüb., others from *Agrotis præcox*, L., by Porritt, and bred by himself from *Diloba cæruleocephala*, L. Cocoons white, irregularly piled, connected by a web of filaments more closely woven than that of *tetricus*.

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entirely in accord with those of Ratzeburg, to which we shall refer under *Apanteles fulvipes*, Nees (see note, *infra*). The caterpillar observed by Goureau, after nourishing 60 parasites, and having been pierced with 60 holes, retained a languishing vitality for 8—10 days more, almost without power of motion. A post-mortem inspection shows in such cases that the holes made by the emerging maggots are marked each by a black speck. The specks are arranged on either side along the side of the spiracles, only 5—6 out of 60 occurring elsewhere, as in the back or the belly. This fact indicates that the maggots live in the vicinity of the tracheæ, probably because the air there obtainable is necessary for their imperfect respiration. The lateral tubercles above mentioned are organs whose function is temporary, being limited to the few moments during which the maggot is wriggling through the skin of the victim. Having forced a hole, and exserted the fore part of its body, it bends either to the right or left, exposing by that action a set of tubercles (2—5 in number) on the convex side, while the same number disappear on the concave side. The exserted tubercles rest upon the edge of the hole, and serve as a *point d'appui* for the elevation of the body on the opposite side. The same action is then reversed, and so on alternately, until the whole body is disengaged. After the appearance of the perfect parasites, Goureau, having observed the union of the sexes, introduced among them a lepidopterous larva, with portions of a cabbage upon which it was feeding. They refused, however, to deposit their eggs in this caterpillar, which perhaps was not of a species which they would naturally attack. They showed a fondness for the cabbage, which they bit and sucked with avidity, proving that it is not contrary to their habits to take food in the imago-state.

6. *Apanteles ordinarius*, Ratz.

Microgaster ordinarius, Ratz., Ichn. d. Forst., i., 71.
M. reconditus, Hart., Jahresb., 252 (not of Nees, Wesm.)
Apanteles ordinarius, Reinh., Berl. ent. Zeit., 1880, p. 368, ♂ ♀.

Black; palpi, apex of mandibles, margins of segments 1—2 narrowly, belly at the base broadly, squamulæ, femora, and tibiæ, testaceous; middle femora above, hind femora above and at the apex, or entirely, with the apex of their tibiæ, black. Wings hyaline, stigma fuscous. Mesothorax thickly punctulate, rather shining; scutellum smooth; pleuræ punctulate, shining; metathorax rugose, carinated. Segment 1 somewhat longer than broad, and, with the 2d, rugulose, both with a smooth medial carina; 2 not shorter than 3. Terebra very short. Hind coxæ punctulate, shining. Inner spur of the hind tibiæ longer than ½ the metatarsus. ♂ ♀. Length, 1¼—1¾; wings, 3⅛—4⅜ lin.

Second abscissa of the radius inchoate, punctiform. Abdomen above broad and flat, lanceolate and compressed beneath at the apex. First joint of the trochanters black, the 2d testaceous. Much like *rubripes*, Hal., but distinguished by greater size, colour of the legs, &c. Antennæ ♀ shorter than the body. According to Reinhard the hind coxæ are granulated, dull; Ratzeburg says nothing about this character, which can hardly be attributed to the present insect; the hind coxæ are punctulate indeed, but not less shining than usual.

Seems to be uncommon in England; but a female is in Parfitt's collection, and two males and one female in that of Fitch, all having the hind femora black. Described by Ratzeburg as an abundant and constant parasite of *Lasiocampa pini*, L., in Germany. It takes its name from the regular rows in which the cocoons are usually placed on the leaves and twigs of the pine. According to Brischke, the white gregarious cocoons envelop the larva as with a furred coat; see Ratz., Die Waldv., pl. iii., f. S.‴ Also bred from *Bombyx rubi*, L.; for a detailed account of its hatching from this species, see Ratz., Ichn. d. Forst., i., 65. *Hemiteles fulvipes*, Gr., and *areator*, Gr., are hyperparasites.

N.B.—The specimens referred to by Brischke, which were determined by Reinhard, and bred from *Myelophila cribrum*, Schiff., are larger, with segment 3 rufous, and the wings more infumated; probably a different species.

7. *Apanteles congestus*, Nees.

Microgaster congestus, Nees, Mon., ii., 405.
Apanteles congestus, Reinh., Berl. ent. Zeit., 1880, p. 369, ♂ ♀.
Microgaster globatus, Bouché, Naturg. (1834), 155.
M. intricatus, Hal., Ent. Mag., ii., 252, ♀; *cf.* 468, note.
M. perspicuus, Wesm., Nouv. Mém. Ac. Brux., 1837, p. 45, ♂ ♀; Ratz., Ichn. d. Forst., iii., 55 (not of Nees).

Black; antennæ ♂ often beneath and at the tips, with the palpi, testaceous; fore legs rufo-testaceous, their femora black at the base; middle and hind legs black, 2d joint of the trochanters and base of the tibiæ, rufo-testaceous; or femora and tibiæ rufo-testaceous; hind femora at the apex and on the upper edge, black or fuscous. Wings fusco-hyaline, stigma fuscous. Mesothorax thickly punctulate, dull; scutellum shining, punctulate; metathorax and segments 1—2 coarsely rugose; segment 1 longer than broad, narrowed at the base, truncate; 2 as long as 3. Terebra very short. Hind coxæ rugulose above. Spurs of the hind tibiæ slender, shorter than ½ the metatarsus. ♂ ♀. Length 1—1¼; wings 2—2½ lin.

The hind coxæ above are distinctly rugulose, almost as rough as the base of the abdomen, by which character the species may be separated from *spurius*, *difficilis*, *gracilis*, and others, which it closely resembles. Haliday does not mention the hind coxæ, but his description of the nest of *intricatus* shows that he had this insect in view. The same remark applies to Bouché's *globatus*. Wesmael's description is abundantly conclusive. Haliday (MS. in Brit. Mus.) makes *sericeus*, Nees, a synonym of this species; but it agrees much better with the solitary parasite to which we have united it.

Very common. The gregarious larvæ form white cocoons, irregularly piled together, and enveloped in a woolly ball of oval shape and dull yellow colour, as large as a hazel- or even walnut. These balls are usually attached to blades of grass, and resemble the nests of certain spiders, for which they have often been taken, *e.g.*, by Ratzeburg, Ichn. d. Forst., iii., 55, and this is the species referred to by Cameron, E. M. M., x., 211. It has been asserted that the victim-larva before its death spins this covering for the protection of the undeserving brood of parasites. See, however, Réaumur, i., pt. ii., p. 222; and Haliday (Ent. Mag., ii., 235) remarks that it would be a singular fact if a caterpillar whose inside has been devoured should be found provided with an extra supply of silk for this unnecessary purpose. Reinhard states that when this *Microgaster* inhabits certain larvæ, *e.g.*, those of *Melitæa*, the cocoons are without an external covering. But in this case there has probably been some mistake as to the species. Described above from specimens reared by Bignell from *Hadena pisi*, L., accompanied by their nest. Bred copiously by other lepidopterists from *Spilosoma lubricipeda*, Esp., *Acronycta rumicis*, L., *Triphæna pronuba*, L., *Calocampa exoleta*, L., and *Cucullia artemisiæ*, Fab., &c. By Brischke from *Vanessa urticæ*, L., *Zygæna filipendulæ*, L., *Tæniocampa incerta*, Hufn., *Cucullia argentea*, Hufn., *C. asteris*, Schiff., *Plusia gamma*, L., &c. By Giraud from *Pygæra anastomosis*, L. (*cf.* Verh. z-b. Ges. Wien, 1866, p. 952), *Plusia chrysitis*, L., and *Eupithecia abbreviata*, Ste.

8. *Apanteles ferrugineus*, Reinh. MS. (Pl. V., fig. 6).

Rufo-testaceus capite et metathorace nigris. Antennæ apicem versus, segmenti 2di area media, pectus pro parte, et abdomen postice plus minus, fusca vel nigricantia. Venter, alarum squamulæ, stigma, nervique omnes, flavida. Coxæ posticæ interdum supra fusco-maculatæ. Corpus totum depressum. Mesothorax confertim punctatus, nitidulus; scutellum læve, nitidum. Pleuræ granulatæ, spatio sub alis nitido, lævi. Metathorax productus, depressus, utrinque marginatus, medio carinulatus, et cum segmentis 1—2 subtilissime rugulosus, obscurus; segmentum 1um longius quam latius, apice truncatum, basi vix angustatum; 2dum 1mo latius, 3tio non brevius, utrinque arcuato-impressum; cætera lævia, nitida. Terebra brevissima. Valvula ventralis inconspicua. Coxæ posticæ subnitidæ. Tibiarum posticarum calcaria gracilia, metatarsi dimidio multo breviora.

Rufo-testaceous; head and metathorax black. Antennæ towards the apex, a space on the disk of segment 2, the pectus partially, and the abdomen posteriorly more or less, fuscous or blackish. Belly, squamulæ, stigma, and nervures, yellowish. Hind coxæ sometimes infuscated above. The whole body is very depressed. Mesothorax thickly punctate, rather shining; scutellum smooth, shining. Pleuræ granulated, with a smooth space underneath the wings. Metathorax produced, depressed, margined at the sides, with a faint medial carina, and together with segments 1—2, minutely rugulose, dull; segment 1 longer than broad, truncated at the apex, scarcely narrowed at the base; 2 wider than 1, not shorter than 3, with two impressed curved lateral lines; the rest smooth and shining. Terebra very short. Valvula ventralis not carinated, closely applied to the belly. Hind coxæ somewhat shining. Spurs of the hind tibiæ slender, much shorter than ½ the metatarsus. ♂ ♀. Length, 1⅓; wings, 2⅔ lin.

A species remarkable for its colour, and differing considerably in structure from any other, though the form of the 1st segment refers it to this section. The mesothorax and scutellum are depressed so as to be in the same plane as the elongate metathorax, a conformation resembling that of *Belyta*, and often belonging to insects of subcortical habits.

Discovered by Porritt, who reared many from the larvæ of *Chilo phragmitellus*, Hüb., inhabiting the interior of reeds. 29 are preserved on one card. Cocoons silvery white, subtransparent, attached singly or in small groups by a few threads to the inside of the reed-stem.

9. *Apanteles Bignellii*, n. s.

♀. Niger, flagelli basi pallida; palpis, abdomine, pedibusque cum coxis, flavo-testaceis; segmentorum basi fusca. Alæ albido hyalinæ costa stigmate nervis fusco-testaceis. Antennæ perbreves, capite cum thorace non longiores, submoniliformes. Mesothorax et scutellum confertim punctulata, subnitida; metathorax leviter rugulosus, subnitidus. Abdominis segmentum 1mum latitudine sesquilongius, lateribus pone medium paulo angustatum, marginatum, truncatum, angulis posticis obtusis, subrugulosum, nitidiusculum; 2dum transversum, 3tio æquale, 1mo latius, subrugulosum vel fere læve, subnitidum; cætera lævia. Abdomen apice infra compressum. Terebra subexserta. Valvula ventralis anum paulo superans. ♂. Antennæ totæ nigræ, corpore longiores, filiformes. Abdomen nigrum; venter basi pallidus. Femora cum coxis picea vel fusca, tibiis tarsisque testaceis.

♀. Black, base of the flagellum pale; palpi, abdomen, and legs, with the coxæ, flavo-testaceous; abdominal segments fuscous at the base. Wings whitish hyaline; costa, stigma, and nervures, fusco-testaceous. Antennæ not longer than the head and thorax, submoniliform. Mesothorax and scutellum thickly punctulate, somewhat shining; metathorax slightly rugulose, somewhat shining. Segment 1 half as long again as its width, slightly narrowed behind the middle, margined, truncated, the hind angles obtuse, subrugulose, somewhat shining; 2 transverse, as long as 3, broader than 1, subrugulose or almost smooth, somewhat shining; the remaining segments smooth. Abdomen compressed beneath at the apex. Terebra subexserted. Valvula ventralis somewhat surpassing the anus. ♂. Antennæ entirely black, longer than the body, filiform. Abdomen black; belly pale at the base. Femora and coxæ pitchy or fuscous; tibiæ and tarsi testaceous. ♂ ♀. Length. ¾; wings, 2¼ lin.

Described from 4 males, 5 females. The sexes are so unlike that no one, without breeding them, would suspect their identity. They are also anomalous in some other respects. Segment 1 is narrowed a little towards the apex, as in Sect. IV., but still distinctly truncated, as in Sect. I. Segment 2 is less rugulose than 1, in some specimens almost as smooth as the following segments; it is canaliculated in the middle, and furnished with two arcuate impressions converging forwards, as in Sect. III.; the space enclosed between the lines is raised and shining; but this structure is irregular and indistinct. In the ♀ the abdomen is testaceous; segment 1 at the base, and 2—5 more narrowly, fuscous. The cariniform edge of the belly and the subulated valves of the terebra are black.

Gregarious; bred in some numbers by Bignell from the larvæ of *Melitæa aurinia*, Rott., taken in North Devon. The white cocoons are enclosed in a common web of cottony texture.

10. *Apanteles analis*, Nees.

Microgaster analis, Nees, Mon., i., 180; Wesm., Nouv. Mém. Ac. Brux., 1837, p. 59, ♀.

M. prætextatus, Hal., Ent. Mag., ii., 254, ♀.

Apanteles acuminatus, Reinh., Berl. ent. Zeit., 1880, p. 370, ♂ ♀.

Black; mandibles rufous; abdomen ♀ at the apex, with the sides and belly entirely, palpi, squamulæ, and legs, flavo-testaceous; hind coxæ more or less fuscous; tarsi fuscescent. Abdomen ♂ black, belly at the base broadly testaceous. Wings hyaline, stigma testaceous. Mesothorax, scutellum, and pleuræ, thickly punctulate, dull; metathorax rugose. Abdomen towards the apex subcompressed, acuminated; segments 1—2 rugose, the rest smooth and shining; segment 1 subquadrate, margined, broadly truncate; 2 wider than 1, shorter than 3. Terebra very short. Hind coxæ punctulate, shining. Valvula ventralis somewhat surpassing the anus. ♂ ♀. Length, 1⅓; wings, 2½ lin.

Var. ♀. Hind femora tipped with fuscous; segments 1—2, and base of 3, testaceous; 7 fuscescent; or 2—4 testaceous.

Much resembles *ruficrus*, Hal., in form and sculpture, but the hind coxæ are smoother, and the colours different. Six specimens were in Fitch's collection, of which three are destroyed, leaving three females. On another card are five males and one female; their origin is not stated. Bred on the Continent, according to Reinhard, from *Melitæa** *Maturna*, L., and *Phœbe*, Fab. Cocoons white.

11. *Apanteles limbatus*, n. s.

Niger. segmentorum 1—2 limbo laterali. ventris basi. palpis, squamulis. pedibusque testaceis; coxis nigris; femorum posticorum apice supra, tibiis iisdem apice, tarsis fere totis, fuscis. Alæ subfusco-hyalinæ stigmate fusco. Mesothorax confertim punctulatus, subnitidus; pleuræ fere læves; scutellum nitidum punctulatum. Metathorax rugulosus. Segmentum 1mum longius quam latius, basi parum angustatum, cum 2do rugulosum: hoc 3tio vix brevius, medio subcarinatum, 1mo latius; cætera lævia. Terebra subexserta. Coxæ posticæ nitidæ. punctulatæ. Tibiarum posticarum calcar internum metatarsi dimidio longius, intermediarum metatarsi dimidio æquale.

Black; lateral margins of segments 1—2, belly at the base, palpi, squamulæ, and legs, testaceous; coxæ black; hind femora at the apex above, their tibiæ at the apex, and tarsi almost entirely, fuscous. Wings dusky hyaline, stigma fuscous. Mesothorax thickly punctulate, somewhat shining; pleuræ almost smooth; scutellum shining, punctulate. Metathorax rugulose. Segment 1 longer than broad, hardly narrowed at the base, and like the 2d, rugulose; 2 broader than 1. scarcely shorter than 3, subcarinated in the middle; the rest smooth. Terebra subexserted. Hind coxæ shining, punctulate. Inner spur of the hind tibiæ longer than ½ the metatarsus; that of the middle pair as long as ½ the metatarsus. ♂ ♀. Length, 1⅓; wings, 2⅔ lin.

Very near *affinis*, Nees, Mon., i., 176; Reinh., Berl. ent. Zeit., 1880, p. 370, which at first I supposed it to be. It does not, however, agree with Reinhard's description: the mesothorax is thickly punctulate, and hardly shining; the hind femora and tibiæ are tipped with fuscous; the wings are not hyaline, but tinted, and the stigma is not flavo-testaceous. With the description

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* Probably these are the butterflies meant: but authors' names being omitted in the Berl. ent. Zeit., there is room for doubt. The name *Maturna* has been given to four, and *Phœbe* to three, different species of *Melitæa*.

of Nees it does not agree, because it is larger than *glomeratus*, L., the 1st segment is not canaliculated in the middle, and the wings are not pure hyaline.

Described from 14 specimens bred by Bignell: six females from *Abraxas grossulariata*, L., and the rest from unrecorded larvæ, seven being males. Gregarious. Cocoons pale lemon-colour, almost white, irregularly clustered, naked, connected merely by a few threads.

12. *Apanteles rubripes*, Hal.

Microgaster rubripes, Hal., Ent. Mag., ii., 253, ♀.
Apanteles rubripes, Reinh., Berl. ent. Zeit., 1880, p. 370, ♂ ♀.
? *Microgaster gastropachæ*, Bouché, Naturg. (1834), 157; Ratz., Ichn. d. Forst., i., 72.

Black, with pale palpi; belly at the base, and legs, rufo-testaceous; squamulæ rufo-fuscous; coxæ black; hind femora often with a fuscous apical spot, and hind tibiæ tipped with fuscous. Segments 1—2 narrowly edged with testaceous at the sides. Wings hyaline, stigma fuscous. Mesothorax and pleuræ thickly punctulate, shining, pubescent; scutellum smoother; metathorax rugulose. Segment 1 subquadrate, truncate, rugulose; 2 rugulose, shorter than 3, carinated at the base; the rest smooth and shining; segment 3 with some scattered punctures. Hind coxæ above shining, punctulate. Inner spur of the hind tibiæ longer than ½ the metatarsus. Terebra very short. ♂ ♀. Length, 1½; wings, 3¾ lin.

Antennæ beneath more or less piceous. The synonym *gastropachæ*, Bouché, adduced by Reinhard, is not free from difficulties. Bouché speaks of a subtriangular enclosed space upon segment 2, and Ratzeburg insists specially upon the colour of the coxæ, which he says are not black, but brown. The foreign specimens moreover were bred from Bombyces, which is not the case in England. The size mentioned by Reinhard, 2·8 mill. (= 1⅔ lin.), is rather less than that of British examples. Reared on the Continent from *Bembecia hylæiformis*, Lasp., *Bombyx neustria*, L., *Geometra papilionaria*, L., *Abraxas grossulariata*, L., *Cymatophora or*, Fab., &c. Some confusion of species may here be suspected.

Closely resembling *limbatus*, No. 11, but apparently distinct. It is somewhat larger; the wings are more hyaline, segment 1 is more quadrate, and its margins less broadly testaceous; the cocoons are more obviously different.

Bred in England commonly from *Geometra papilionaria*, L.; by Curtis, four broods by Bignell, in July, and another by Raynor were named by Reinhard, including, however, one from *Cabera pusaria*, L., now destroyed, the cocoon of which shows it to have been another species. Also reared by Harding from *Vanessa urticæ*, L., 8 on a card; and 5 by Cameron in Scotland, from *Pieris brassicæ*, L. Gregarious. Cocoons sulphur-yellow, irregularly clustered, naked, and connected by a few filaments. They are larger and paler than those of *glomeratus*; and much more yellow than those of *limbatus*.

13. *Apanteles rubecula*, n. s.

Niger, palpis, ventrisque basi anguste, pallidis. Pedes rufo-testacei, femoribus posticis apice nigris, tibiis iisdem apice tarsisque fuscescentibus. Alæ leviter infuscatæ, stigmate nervisque fuscis, squamulis nigris. Mesothorax confertissime punctulatus, subnitidus; scutellum lævius; metathorax rugulosus, carinulatus. Segmentum 1mum non longius quam latius, basi paulo angustatum, apice late truncatum, cum 2do rugulosum; hoc 3tio brevius, medio carinulatum; cætera lævia, nitida; segmentum 3tium vage punctulatum. Coxæ posticæ nitidæ, punctulatæ. Tibiarum posticarum calcar internum metatarsi dimidio æquale. Terebra brevissima.

Black; palpi, and belly at the base narrowly, pale. Legs rufo-testaceous, hind femora black at the apex, their tibiæ at the apex, and tarsi, fuscescent. Wings somewhat dusky hyaline, stigma and nervures fuscous, squamulæ black. Mesothorax very thickly punctulate, somewhat shining; scutellum smoother; metathorax rugulose, carinulated. Segment 1 not longer than broad, slightly narrowed at the base, the apex broadly truncated, rugulose like the 2d, which is shorter than the 3d, carinulated in the middle; 3d (with some scattered punctures) and following, smooth, shining. Hind coxæ shining, punctulate. Inner spur of the hind tibiæ equal to ½ the metatarsus. Terebra very short. ♀. Length, 1½; wings, 3¾ lin.

Separated from *rubripes*, Hal., on the following grounds:—The squamulæ are black; the wings have a dusky tinge; the metathorax is finely carinated; the cocoon and habits of the larva are different.

Two specimens were bred by Bignell, singly, on June 17th, from half-grown larvæ of *Pieris rapæ*, L. The cocoon differs in texture and colour from that of *rubripes*, Hal.; it is not woolly, but naked, wrinkled, and cream-coloured, nearly white; it is also somewhat larger, as is the perfect insect.

14. *Apanteles glomeratus*, L.

Ichneumon glomeratus, Lin., F. S., 410.

Microgaster glomeratus, Hal., Ent. Mag., ii., 250, ♂ ♀; Reinh., Berl. ent. Zeit., 1881, p. 33, ♂ ♀; Bouché, Naturg. (1834), 150; Tasch., Naturg. wirb. Thiere, 93, pl. iii., ff. 3, 4. *Cf.* Réau., Mém., ii., 419, pl. xxxiii., ff. 2—13; DeGeer, Mém., i., pl. xvi., f. 6; Bree, in Loud. Mag., 1832, pp. 105—107; Westw., in Loud. Mag., 1832, p. 301, and pp. 107—109 (economy); Westw., Int., ii., 144 (econ.), and pl. lxxvi., f. 16 (larva); Cur., Farm. Ins., 97.

M. reconditus, Nees, Mon., i., 174; Wesm., Nouv. Mém. Ac. Brux., 1837, p. 47, pl., fig. F. ♂ ♀.

M. cratægi, Ratz., Ichn. d. Forst., i., 72.

Black, with pale palpi; segment 1 at the sides narrowly, belly at the base, and legs, rufo-testaceous; hind femora black above towards the apex, hind tibiæ tipped with fuscous, coxæ black. Wings hyaline, squamulæ black, stigma fuscous. Mesothorax thickly and finely punctulate, somewhat shining; scutellum and pleuræ smooth. Metathorax rugulose. Segment 1 longer than its breadth by one half, the sides parallel, truncate at the apex, concave at the base, rugulose; 2 broader than 1, shorter than 3, with two lateral oblique impressions, rugulose, with a smooth medial obtuse carina; the rest smooth and shining. Hind coxæ punctulate, shining. Inner spur of the hind tibiæ shorter than $\frac{1}{2}$ the metatarsus. Terebra very short. ♂ ♀. Length $1\frac{1}{3}$; wings, $2\frac{4}{5}$ lin.

Segments 1—2 are shining, and slightly or moderately rugulose. The oblique impressed lines on segment 2, common to many species are here more developed, curved, and approximated at the fore margin, approaching the structure of Sect. III. They terminate in two distinct foveæ, which are one of the surest marks by which to recognise the species. The hind femora of the ♂ are usually more broadly black towards the apex than those of the ♀. Antennæ ♂ as long as the body.

Var. Antennæ ♂ longer than the body; segment 2 smooth; 4 posterior femora with a black line above; stigma pale fuscous. ♀. The same, but the 2d segment is rugulose, and the antennæ shorter. Length, 1 line. Bred by me formerly from *P. brassicæ*, L. Specimens are also in Fitch's collection. A further observation of them, together with their cocoons, is desirable. They were returned by Reinhard with the name *glomeratus*.

A brood similarly named, and bred by Bignell from *Phigalia pedaria*, Fab., is not the present species, but *difficilis*, Nees. Two or three of the cocoons are accidentally more yellow than usual.

A. glomeratus is the well-known parasite of all the species of *Pieris*. Bignell has also obtained it from *Abraxas grossulariata*, L.; the specimens from the moth are absolutely the same. The sulphur-yellow cocoons of the gregarious maggots may be found plentifully near cabbage-gardens. They are irregularly heaped together, without a common covering, but merely connected by a slight web. As in the case of *congestus*, Nees, No. 7, it has been asserted that this web is constructed by the dying caterpillar of the butterfly. That this is not the fact I can testify, from having watched the operations of these parasites. The *Pieris*-larva was perfectly inert and moribund. Curtis counted as many as 67 Microgasters which issued from the body of a single caterpillar of *P. brassicæ*, L.; Bignell counted 142 cocoons from a similar larva (Entom., xvi., 263). They usually come out in September and spin their cocoons, in which they pass the winter. In the following May they hatch, and are ready to attack the spring-broods of butterflies. Giraud and Brischke have obtained this species also from *Aporia cratægi*, L.; and the latter (as he states) from *Smerinthus populi*, L., *Zygæna ephialtes*, L., and *Bembecia hylæiformis*, Lasp. Miss Pasley, of Windermere (E. M. M., i., 281), records the singular fact that an imago of *Pieris rapæ*, L., emerged from the pupa with two of the yellow cocoons of this parasite, containing pupæ, rolled up in the wings. Bouché (Naturg., 168, No. 61) has described one of the *Chalcididæ*, which he calls *Diplolepis microgastri*, living parasitically in the cocoons of *glomeratus*, 3 or 4 together: the cocoons so infested are paler than healthy ones. *Hemiteles fulvipes*, Gr., is also a hyper-parasite, frequently taking the place of the entire brood.

15. *Apanteles sericeus*, Nees.

Microgaster sericeus, Nees, Mon., i., 184, ♂ ♀.
M. præpotens, Hal., Ent. Mag., ii., 252, ♀.
M. brevicornis, Wesm., Nouv. Mém. Ac. Brux., 1837, p. 50, ♀; *Apanteles brevicornis*, Reinh., Berl. ent. Zeit., 1881, p. 34, ♂ ♀.
M. fuliginosus, Ratz., Ichn. d. Forst., iii., 56, partly (not of Wesm.).

Deep black; mandibles tipped with rufous, palpi pale; fore femora, apex of the intermediate femora narrowly, and all the tibiæ, rufo-testaceous; middle and hind tibiæ more or less tipped with fuscous. Wings whitish hyaline, squamulæ black, stigma fuscous. Antennæ ♂ as long as the body; of the ♀ only $\frac{2}{3}$ as long, submoniliform at the apex. Mesothorax very shining, subpunctulate; metathorax rugulose. Segment 1 longer than broad, with parallel sides, rugulose and somewhat shining, like the 2d, which is a little shorter than the 3d; the rest smooth and shining. Hind coxæ smooth, shining. Terebra shortly exserted. Ventral valve surpassing the anus. Spurs of the hind tibiæ shorter than $\frac{1}{2}$ the metatarsus. ♂ ♀. Length, $1\frac{1}{2}$—$1\frac{3}{4}$; wings, 3—$3\frac{1}{2}$ lin.

A large species, characterised by intense blackness, very shining thorax, whitish wings, and in the ♀ unusually short antennæ, exserted terebra and ventral valve, whereby the abdomen appears acuminated. *M. sericeus*, Nees, has not hitherto been identified, but the agreement of our larger specimens with his description is very complete. The structure of the 2d segment, with two obsolete, lateral, impressed, converging lines, enclosing a rugulose space, is sufficiently indicated by Nees. It seems equally certain that *præpotens*, Hal., is to be referred to this species, although Reinhard places a (?) after the name. *M. placidus*, Hal., which Reinhard treats as a synonym, is a distinct species, and not hard to recognise among English specimens. Besides, Haliday was too careful a writer to describe the same insect under two different names, with only *lineola* between them. Nees compares his *sericeus* with *juniperatæ*, Bouché, but the latter agrees only in size, differing in the subfuscous wings, less shining surface, length of the ♀ antennæ, shorter ventral valve, and colour of the cocoons.

Common. A solitary parasite. Bred by Bignell from *Tethea retusa*, L., *Dianthœcia cucubali*, Fuess., and *capsincola*, Hüb., *Emmelesia alchemillata*, L., and *Eupithecia pulchellata*, Ste. By Fitch from *Mimeseoptilus plagiodactylus*, Staint., and by Raynor from *Eupithecia valerianata*, Hüb. By Cameron, at Milngavie, Scotland, from *Thera juniperata*, L. Bignell obtained his specimens from *E. pulchellata* on March 24th, out of cocoons taken in foxglove-flowers the preceding July; hence it appears that some of them hybernate as pupæ, although the majority come out in July and August. Nees also obtained his *sericeus* April 25th out of a larva which feeds on *Digitalis ambigua* flowers. Bred on the Continent by Kriechbaumer, of Munich, from *Hypsipetes impluviatus*, Hüb.; according to Ratzeburg by Kirchner from *Hyponomeuta padellus*, L. Cocoons pale lemon-colour, or whitish yellow, attached singly to various plants. Cameron bred two hyper-parasitic species of *Hemiteles* from these cocoons (Zool., 1880, p. 269).

The origin of 4 specimens in Fitch's collection requires explanation. They are ticketed as having been hatched from *cocoons* of *Hypera variabilis*, Hbst., and some of the beetles are preserved with them. The difficulty is that Microgasters spin cocoons for themselves, and are not known as using those of other insects.

Under *brevicornis*, Wesm., = *fuliginosus*, Ratz., Brischke states that he has bred this from *Erynnis alceæ*, Esp., also from a *Geometer* and a *Tortrix*. He describes the cocoons as white and gregarious, which renders the whole observation doubtful.

16. *Apanteles spurius*, Wesm.

Microgaster spurius, Wesm., Nouv. Mém. Ac. Brux., 1837, p. 49; *Apanteles spurius*, Reinh., Berl. ent. Zeit., 1881, p. 34, ♂ ♀.

Black; palpi pale; legs rufo-testaceous, fore femora at the base only, the others entirely, black; hind tibiæ rarely fuscescent at the apex. Wings hyaline, squamulæ black, stigma fuscous. Mesothorax thickly and very finely punctate, dull, more shining at the hind angles; scutellum sparingly punctulate, shining. Mesopleuræ shining and smooth. Metathorax and segments 1—2 rugulose, dull; segment 1 subquadrate, a little narrowed at the base; 2 hardly shorter than 3, which, with the rest, is smooth and shining. Terebra subexserted. Hind coxæ smooth. Spurs of the hind tibiæ slender, distinctly shorter than ½ the metatarsus. ♂ ♀. Length, 1—1½; wings, 2—3 lin.

Var. All the femora piceo-testaceous.

Care must be taken to distinguish this from *difficilis*, Nees, and *caiæ*, Bouché. In the former the terebra is very short; in both, the spurs of the hind tibiæ are stouter and longer than those of *spurius*, which has also the legs longer and more slender, especially the joints of the hind tarsi, the hind tibiæ almost always concolorous at the apex, and makes different cocoons. "Probably, but not certainly," says Reinhard, "*M. pieridis*, Bouché, Naturg., p. 152, is to be regarded as identical with this species." The cocoons, however, are described by Bouché as not white, but "dunkelgelb."

Common. Gregarious. Bred by Bignell from *Vanessa urticæ*, L., *Melitæa aurinia*, Rott., *Leucania littoralis*, Cur., and *Agrotis præcox*, L. By W. H. B. Fletcher from *Zonosoma orbicularia*, Hüb.; by Raynor from *Hypsipetes trifasciata*, Bork.; by Porritt from *Agrotis præcox*, L. Reared plentifully on the Continent by Nördlinger at Grand Jouan, in Brittany, from *Dicranura vinula*, L., the larvæ of which perished just before their last moult in autumn, and the parasites appeared early in the following May. By Brischke from *Melitæa Maturna*, L., *Argynnis Latona*, L., *Polyommatus Dorylas*, Hufn., *Zygæna ephialtes*, L., *Bombyx castrensis*, L., *Dicranura bifida*, Hüb., *Lophopteryx camelina*, L., *Eupithecia sobrinata*, Hüb., *Thera juniperata*, L., and *Pionea forficalis*, L. By Giraud from *Vanessa urticæ*, L., and *Zygæna filipendulæ*, L.; and by Franz Löw, in September, from *Hadena oleracea*, L.

Cocoons white, with hardly a sulphur-tinge, enveloped in a cottony ball, like those of *congestus*, but white, and less regularly formed.

17. *Apanteles Geryonis*, n. s.

Niger, palpis pallidis. Segmentum 1mum lateribus anguste, venter basi, pedesque, rufo-testacea; femora posteriora supra nigro lineata vel tota fusca, tarsis apice fuscis; coxæ nigræ. Alæ hyalinæ, squamulis fuscis, stigmate subferrugineo vel pallide fusco. Mesothorax confertim subtiliter punctulatus, opacus; pleuræ similes, spatio sub alis nitido. Metathorax punctatus, opacus. Segmentum 1mum longius quam latius, basi subangustatum, apice truncatum, cum 2do rugulosum, opacum; hoc 1mo latius, 3tio brevius, medio carinatum, linea impressa obsoleta utrinque marginatum; cætera nitida, lævia. Terebra brevissima. Tibiarum posticarum calcar internum metatarsi dimidio paulo brevius. Coxæ posticæ nitidæ.

Black, with pale palpi; segment 1 at the sides narrowly, belly at the base, and legs, rufo-testaceous; posterior femora with a black line above, or wholly fuscous, their tarsi fuscous at the tips; coxæ black. Wings hyaline, squamulæ fuscous, stigma subferrugineo-fuscous. Mesothorax thickly and finely punctulate, dull; pleuræ the same, with a shining space beneath the wings. Metathorax punctate, dull. Segment 1 longer than broad, slightly narrowed at the base, truncate at the apex, and like the 2d, rugulose, dull; segment 2 wider than 1, shorter than 3, carinated in the middle, margined on each by an obsolete impressed line;

the rest smooth and shining. Terebra very short. Inner spur of the hind tibiæ a little shorter than ½ the metatarsus. Hind coxæ shining. ♀. Length, 1; wings, 2⅓ lin.

Described from 3 females. Smaller than *glomeratus*, less shining, and with a differently formed 2d segment. The legs are more marked with black, and the pleuræ obscure with punctulation. Nothing but the colour of the legs, and the different source from which the insects were bred, prevents them from being considered *A. vanessæ*, Reinh. This, however, has the legs wholly pale, and is parasitic on *Vanessa*, *Argynnis*, and *Limenitis*.

Bred by Bignell from *Procris Geryon*, Hüb. Cocoons pure white, attached together by some loose threads.

18. *Apanteles zygænarum*, n. s.

Niger, palpis pallidis; ventris macula basali, femoribus anticis præter basin, mediis apice, tibiisque omnibus, rufo-testaceis; harum posticis apice fuscis; trochanteribus inferis testaceis. Alæ fusco-hyalinæ, squamulis nigris; stigmate nigro-fusco. Mesothorax subscabriculus, opacus. Scutellum confertim punctulatum, nitidulum. Mesopleuræ nitidæ, læves, antice punctulatæ. Metathorax carinulatus, et cum segmentis 1—2 rugulosus, subnitidus; horum 1mum longius quam latius, basin versus sensim angustatum, apice truncatum; 2dum medio elevatum, utrinque arcuato-impressum, 3tio paulo brevius; hoc interdum basi vage subrugulosum; cætera lævia, nitida. Terebra brevissima. Valvula ventralis magna, subtruncata, anum non superans. Coxæ posticæ nitidæ, punctulatæ. Tibiarum posticarum calcar internum gracile, metatarsi dimidio vix paulo longius.

Black, with pale palpi; a basal spot on the belly, fore femora except the base, middle femora at the apex, and all the tarsi, rufo-testaceous; hind tibiæ tipped with fuscous; lower trochanters testaceous. Wings fusco-hyaline, squamulæ black, stigma dark fuscous. Mesothorax dull, subscabriculous. Scutellum thickly punctulate, rather shining. Mesopleuræ shining, smooth, punctulate in front. Metathorax carinulated and, like segments 1—2, rugulose, rather shining; segment 1 longer than broad, gradually narrowed towards the base, truncate at the apex; 2 elevated in the middle, margined on each side with a curved impressed line, somewhat shorter than 3, which is sometimes vaguely subrugulose at the base; the rest smooth and shining. Terebra very short. Valvula ventralis ample, subtruncate, but not surpassing the anus. Hind coxæ shining, punctulate. Inner spur of the hind tibiæ slender, hardly longer than ½ the metatarsus. ♂ ♀. Length, 1½; wings, 3 lin.

Closely allied to *difficilis*, Nees, and *juniperatæ*, Bouché; it equals the latter in size, but differs from both in having the mesothorax more thickly punctate and wholly obscure; the wings are rather lighter than those of *juniperatæ*; the metathorax is carinated, the abdomen at the base more finely rugulose and less shining, and the ventral valve not acuminated.

Two females and 4 males, bred by Bignell from *Zygæna filipendulæ*, L., remain, others having been destroyed. Bignell has also captured a ♀. Cocoons sulphur-yellow, like those of *glomeratus* and *rubripes*. Four cocoons produced the hyperparasite *Hemiteles fulvipes*, Gr.

19. *Apanteles jucundus*, n. s.

Niger; palpis, ventris basi anguste, tibiis, femoribus anticis præter basin, intermediis apice, trochanteribusque inferis, flavo-testaceis; tibiis posticis, tarsisque omnibus apice, obscuris. Alæ albido-hyalinæ, squamulis, nigris, stigmate fusco basi subdilutiore, nervis pallide fuscis, costa prope basin testacea. Mesothorax confertim subtiliter punctulatus, opacus; scutellum vage punctulatum apice lævi. Metathorax punctato rugulosus, medio carinulatus. Segmentum 1mum latitudine media fere sesquilongius, lateribus perpaulo rotundatis, basin versus leviter angustatum, apice truncatum, marginatum, cum 2do rugulosum substriato-punctatum; 2dum carina media lævi, 1mo paulo latius, 3tio non multum brevius, hoc basi utrinque transversim impressum, carinula media inchoata, cum cæteris læve. Terebra brevissima. Valvula ventralis anum non superans. Coxæ posticæ læves. Calcaria postica metatarsi dimidio breviora.

Black; palpi, base of the belly narrowly, tibiæ, fore femora except at the base, middle femora at the apex, and lower trochanters, flavo-testaceous; hind tibiæ, and tips of all the tarsi, obscure. Wings whitish hyaline, squamulæ black, stigma fuscous, with a spot at the inner angle paler, nervures pale fuscous, base of the costa testaceous. Mesothorax thickly and finely punctulate, dull; scutellum sparingly punctulate, the apex smooth. Metathorax punctato-rugulose, with a fine medial carina. Segment 1 about half as long again as its medial width, the sides very slightly curved, somewhat narrowed towards the base, truncate at the apex, margined, rugulose and substriato-punctate like the 2d; 2d with a smooth medial carina, a little wider than the 1st, not much shorter than the 3d; 3d transversely impressed on each side of the base, with an inchoate medial carina, smooth and shining like the remaining segments. Terebra very short. Valvula ventralis not surpassing the anus. Hind coxæ smooth. Spurs of the hind tibiæ shorter than ½ the metatarsus. ♀. Length, 1⅖; wings, 3½ lin.

Var. Femora testaceous, hind pair with an apical black dot. Stigma almost unicolorous.

Certainly distinct from *glomeratus*, which it much resembles. It is larger; the legs are differently coloured (except in the variety); the stigma has an obsolete pale spot at the inner angle; the 2d segment is differently sculptured, wanting the impressed curved lines ending in two foveæ in front, as seen in *glomeratus*.

One ♀ taken by sweeping, in Northamptonshire; another (the var.) is in Fitch's collection, ticketed *glomeratus*.

20. *Apanteles caiæ*, Bouché.

Microgaster caiæ, Bouché, Naturg. (1834), 403.
M. perspicuus, Nees, Mon., i., 177, ♂ ♀ (not of Wesm. or Ratz.)
M. difficilis var. β., Nees, Mon., ii., 403, ♀.
M. glomeratus, Newman, Loud. Mag., 1833, p. 109.

Black; palpi pale; lateral margins of segments 1—2 narrowly, belly at the base, and legs, rufo-testaceous: fore femora at the base, posterior femora more or less, tips of all the tarsi, and sometimes of the hind tibiæ, fuscous. Wings fusco-hyaline, squamulæ black, stigma fuscous. Mesothorax thickly punctulate, dull; scutellum more sparingly, shining. Mesopleuræ punctulate in front, smooth and shining behind. Metathorax and segments 1—2 rugulose, dull; segment 1 subquadrate, truncate, hardly narrower than 2, which is shorter than 3; 3rd and following smooth, shining; lateral impressed lines of segment 2 wide apart, subobsolete. Terebra stout, subexserted. Ventral valve large, surpassing the anus, whereby the abdomen appears acuminated, and apically compressed. Hind coxæ punctulate, shining. Spurs of hind tibiæ somewhat longer than ½ the metatarsus. ♂ ♀. Length, 1¼; wings, 2⅘ lin.

The belly, which is broadly testaceous at the base, the terebra and ventral valve of the ♀, sufficiently distinguish this from *difficilis*, Nees, and *spurius*, Wesm. It also makes different cocoons. Trochanters black; hind tibiæ generally without fuscous tips; posterior femora seldom wholly piceous or fuscous, usually more or less testaceous at the base or in the middle, the edges remaining dark.

Gregarious. Bred by Bouché, Newman, and five times by Bignell, from *Arctia caia*, L., the broods consisting of 4—6 specimens. More of these, named by Reinhard *perspicuus*, Nees, are in Fitch's collection, together with a brood of 9 males, reared by Eedle from *Arctia villica*, L. Cocoons dirty white, irregularly heaped together, and without an external web. Very likely Brischke's specimens, named by him *perspicuus*, Nees, and bred from *Cucullia argentea*, Hufn., belong to this species. Possibly also his *difficilis*, Nees, bred from *Arctia caia*, L., *A. Hebe*, L., and *Spilosoma fuliginosa*, L.; although this is rather less likely.

21. *Apanteles juniperatæ*, Bouché.

Microgaster juniperatæ, Bouché, Naturg. (1834), 154; Ratz., Ichn. d. Forst., i., 74.

Apanteles juniperatæ, Reinh., Berl. ent. Zeit., 1881, p. 34, ♂ ♀.

Black; palpi pale; legs rufo-testaceous; fore and middle femora except at the apex, hind femora entirely, black; middle and hind tibiæ black or fuscous at the apex. Wings infumated, squamulæ black, stigma fuscous. Mesothorax punctulate, pubescent, and with the scutellum, somewhat shining. Mesopleuræ smooth and shining. Metathorax and segments 1—2 rugulose; segment 1 rather longer than wide, with parallel sides; 2 subcarinated, as long as 3; 3 more or less punctulate at the base, and, with the rest, smooth and shining. Terebra very short. Hind coxæ punctulate, shining. Spurs of hind tibiæ stout, somewhat longer than ½ the metatarsus. ♂ ♀. Length, 1½; wings, 3¼ lin.

Very like *A. zygænarum*, No. 18; for differences see that species. Distinguished from *congestus*, *spurius*, and *difficilis* by greater size and tinted wings; from *congestus*, moreover, by the smooth hind coxæ; from *spurius* by the stout elongate hind spurs; and from *difficilis* by the 2d segment, which is not shorter than the 3d. The cocoons are coloured like those of *difficilis*, and unlike those of the others. Identified erroneously by Nees with his *sericeus*; see No. 15. The insects sent to me as types, named by Reinhard, were in great confusion, consisting of 3 species: *juniperatæ*, Bouché, *popularis*, Hal., and *difficilis*, Nees.

Said to have been reared once from a Bombycid, *Laria V-nigrum*, L., by Brischke; otherwise only from Geometræ, and originally by Bouché from *Thera juniperata*, L., in which, according to that author, it lives singly. Other larvæ, however, according to their size, have been found to produce from two to eleven. The parasites when hatched are not gregarious, but form their cocoons separately. On issuing from the victim they spin each a rough case, and afterwards a finer cocoon inside it. The cocoons may be found scattered about on the needles of the juniper, &c., as in the case of *sericeus*. They are of a pale reddish buff, or flesh-colour, like those of *difficilis*, but larger. In the Berl. ent. Zeit. they are not very accurately described as "pale yellowish;" and by Brischke as "paler or darker brownish yellow to sulphur-yellow." In addition to *Thera juniperata*, L., Reinhard mentions *Emmelesia alchemillata*, L., and *Eupithecia sobrinata*, Hüb. The twenty-nine specimens examined by me were bred by Bignell from *Odontoptera bidentata*, Clerck, *Selenia bilunaria*, Esp., *Crocallis elinguaria*, L., *Himera pennaria*, L., and *Cidaria fulvata*, Forst. In the case of *Selenia*, eleven parasites came from the same larva during five or six days, and remained as pupæ about a fortnight. It is not easy to understand how a caterpillar of the size of *S. bilunaria* can accommodate eleven of these rather large *Microgasters*. To the above-mentioned Geometræ may be added, from Brischke, *Eupithecia exiguata*, Hüb., *nanata*, Hüb., *pimpinellata*, Hüb., *lariciata*, Freyer, &c.

22. *Apanteles gracilis*, Cur.

Microgaster gracilis, Cur., B. E., 321, No. 12; Hal., Ent. Mag., ii., 253, ♂ ♀.

Black; legs flavo-ferruginous, 4 posterior femora with a fuscous streak above and below, or nearly all fuscous, their tibiæ also infuscated in the ♂; coxæ and trochanters black. Wings hyaline, squamulæ fuscous, stigma pale ferruginous. Mesothorax and scutellum thickly punctulate, dull; metathorax smoother and more shining, usually with a medial carina. First segment 1½ times longer than broad, somewhat rounded at the sides, truncate, and with the 2d, and base of the 3d, rugulose, dull; segment 2 as long as 3; the rest smooth and shining. Terebra very short. Valvula ventralis not surpassing the anus. Hind coxæ punctulate, shining. Spurs of hind tibiæ shorter than ½ the metatarsus. ♂ ♀. Length, ⅘; wings, 2⅓ lin.

Like *difficilis*, Nees, but much smaller; the rugulose part of the abdomen is less shining, and segment 2 more distinctly broader than 1; spurs of hind tibiæ proportionally shorter. Antennæ ♀ as long as the body, of the ♂ longer. Stigma rufescent.

Specimens from Leicestershire, under this name, have long been in my collection. On re-examination I find them to agree entirely with Haliday's description, so far as that extends.

23. *Apanteles placidus*, Hal.

Microgaster placidus, Hal., Ent. Mag., ii., 251, ♂.

Black; palpi pale; belly at the base, sides of 1st segment narrowly, femora and tibiæ, rufo-testaceous; fore femora black at the base, posterior pitchy, black above and at the apex, or entirely black; hind tibiæ at the apex, and all the tarsi, fuscous. Antennæ ♂ much longer than the body, beneath and on their apical half sometimes flavo-testaceous. Wings whitish hyaline, stigma fusco-ferruginous. Mesothorax thickly and very finely punctulate, dull in the middle of the disk, posteriorly, together with the scutellum, more shining. Metathorax rugulose, sometimes carinulated. Segment 1 half as long again as its breadth, slightly narrowed at the base, truncated at the apex, rugulose; segment 2 rugulose, as long as 3; the rest smooth and shining. Hind coxæ punctulate, shining. Inner spur of the hind tibia not longer than ½ the metatarsus. Shape slender, elongate. ♂ ♀. Length, 1¼; wings, 2½ lin.

Described from a pair in Bridgman's collection, and a ♀ taken by myself. The ♂ is remarkable for its very long antennæ, of which the apical half is flavo-testaceous, perhaps accidentally. Reinhard refers the species doubtfully to *brevicornis*, Wesm., i. e., *sericeus*, Nees, but the possession of both sexes of *placidus* shows them to be distinct, as correctly supposed by Haliday.

24. *Apanteles nothus*, Reinh. MS.

Niger, pedibus flavo-ferrugineis, femoribus posterioribus, tibiis iisdem apice late, tarsisque fuscis; coxis et trochanteribus nigris. Alæ subfumato-hyalinæ, squamulis, stigmate, nervis, pallide piceis. Mesothorax et scutellum confertim punctulata, parum nitida; metathorax leviter rugulosus. Segmentum 1mum subquadratum, marginatum, truncatum, cum 2do rugulosum, subnitidum; hoc 1mo non multo latius, paulo brevius quam 3tium; cætera lævia. Terebra brevissima. Valvula ventralis anum non superans. Calcaria postica metatarsi dimidio paulo longiora.

Black; legs flavo-ferruginous, 4 posterior femora, their tibiæ at the apex broadly. and the tarsi, fuscous; coxæ and trochanters black. Wings somewhat dusky hyaline, squamulæ, stigma, and nervures pale pitchy. Mesothorax and scutellum thickly punctulate, hardly shining; metathorax slightly rugulose. Segment 1 subquadrate, margined, truncate, rugulose like 2, and somewhat shining; 2 not much wider than 1, rather shorter than 3; the rest smooth. Terebra very short. Valvula ventralis not surpassing the anus. Hind spurs a little longer than ½ the metatarsus. ♂ ♀. Length, ⅔; wings, 1⅘ lin.

This species is the smallest of the section, and very like *gracilis*, Cur. The antennæ are shorter, the legs differently coloured, and the proportions of the abdomen different.

Discovered and bred in some numbers by Bignell from *Anticlea badiata*, Hüb., *Epinephele Ianira*, L., *Melanippe galiata*, Hüb., *Tethea retusa*, L., and *Spilosoma menthastri*, Esp. Those from *Spilosoma* are a trifle larger, but appear to differ in no other respect. The cocoons are white, irregularly clustered, and connected by a few threads.

25. *Apanteles difficilis*, Nees.

Microgaster difficilis, Nees, Mon., i., 182, ♀; *Apanteles difficilis*, Reinh., Berl. ent. Zeit., 1881, p. 35, ♂ ♀.
M. vestalis, Hal., Ent. Mag., ii., 253, ♂ ♀.
M. insidens, Ratz., Ichn. d. Forst., i., 72.
M. melanoscelus, Ratz., *lib. cit.*, 74, ♂.

Black; palpi pale; antennæ often dull reddish underneath; sides of segment 1 narrowly, apex of 4 anterior femora, sometimes 4 posterior at the sides, 2d joint of trochanters, and the tibiæ, rufo-testaceous; 4 posterior, or only hind tibiæ, usually tipped with fuscous. Wings hyaline, squamulæ black, stigma fuscous or dull testaceous. Mesothorax thickly punctulate, dull; scutellum more shining. Mesopleuræ punctulate in front, smooth behind. Metathorax and segments 1—2 minutely rugulose, rather shining; segment 1 longer than broad, a little narrowed near the apex, and truncate; 2 rather shorter than 3, with two obsolete lateral impressions curving inwards anteriorly; 3 and the rest smooth and shining. Terebra very short. Ventral valve not surpassing the anus. Hind coxæ smooth, shining. Spurs of the hind tibiæ stout, longer than ½ the metatarsus. ♂ ♀. Length, 1¼; wings, 2⅘ lin.

Differs from *juniperatæ* by its smaller size, hyaline wings, and impunctulate 3d segment, which is longer than the 2d; from *congestus* by the smooth hind coxæ, and the cocoons; from *spurius* by the stout elongate spurs of the hind tibiæ, and the cocoons; from *gracilis* by larger size, and the absence of a carina on the metathorax.

Common. The cocoons are flesh-coloured or buff, like those of *juniperatæ*; a few, by some accident, are more yellow. The maggots, on leaving the body of their victim, make separate naked cases, without clustering together. From 1 to 20 issue from a single caterpillar, according to its size: Bignell has obtained from a specimen of *Selenia bilunaria*, Esp., a single *A. difficilis* accompanied by one of *A. caberæ*. *A. difficilis* has been reared frequently from Bombyces, more sparingly from *Zygænæ*, *Noctuæ*, and *Geometræ*. In Fitch's collection are 17 specimens on one card, bred from *Bombyx rubi*, L., by Meldola. Bignell's numerous broods are from *Zygæna filipendulæ*, L., *Euchelia jacobææ*, L., *B. rubi*, L., *Agrotis præcox*, L., *Hadena pisi*, L., *Amphidasys betularius*, L., *A. strataria*, Hufn., and *Phigalia pedaria*, Fab.; the last were mixed with *A. glomeratus*, L., probably because some of the cocoons were unusually tinged with yellow. Fitch has reared a brood from a young *Arctia caia*, L.; and a second lot in his collection were obtained by Sotheby (16 specimens) from *Melanippe galiata*, Hüb.; a third by E. A. Butler from *Selenia bilunaria*, Esp. According to Ratzeburg the species has been reared from *Arctia Hebe*, L., *Spilosoma fuliginosa*, L., *Pœcilocampa populi*, L., and *Diloba cæruleocephala*, L. Those recorded by Nees as coming from *Arctia caia*, L., are doubtful, and may belong to his var. β.=*perspicuus*, Nees=*caiæ*, Bouché, which is a distinct species. Brischke gives the following list of victims out of which he has bred this parasite; those above mentioned are not repeated. *Smerinthus populi*, L., *Zygæna trifolii* and *meliloti*, Esp., *ephialtes*, L., *Leucoma salicis*, L., *Lasiocampa ilicifolia*, L., *Lophopteryx camelina*, L., *Notodonta dictæa*, L., *Acronycta euphorbiæ*, Fab., *Misclia oxyacanthæ*, L., *Aplecta tincta*, Brahm, *Odontoptera bidentata*, Clerck, *Eupithecia centaureata*, Fab., *pimpinellata*, Hüb., and *sobrinata*, Hüb., *Melanippe galiata*, Hüb., and *Eucosmia certata*, Hüb.

SECTION II.

26. *Apanteles punctiger*, Wesm.

Microgaster punctiger, Wesm., Nouv. Mém. Ac. Brux., 1837, p. 61, ♀.

? *Apanteles punctiger*, Reinh., Berl. ent. Zeit., 1881, p. 36, ♂ ♀.

Black; antennæ pitchy beneath at the base; palpi, squamulæ, belly at the base, and legs, testaceous; middle coxæ sometimes at the base, hind coxæ entirely, black; hind tibiæ at the apex, and their tarsi except the base, also black. Wings fusco-hyaline, stigma fuscous or fusco-testaceous, with a pale spot at the inner angle. Meso- and metathorax, with the scutellum, thickly punctulate, shining. Segment 1 half as long again as its breadth, truncate, the sides parallel, covered with shallow confluent punctures; 2 more than half as long as 3, broader than 1, hardly rugulose; the rest smooth and shining. Terebra $\frac{1}{4}$ of the abdomen. Valvula ventralis not surpassing the anus. ♂ ♀. Length, $1\frac{1}{3}$; wings, 4 lin.

The single British specimen agrees very well with Wesmael's description, less exactly with that of Reinhard, who states the thorax to be dull instead of shining, and the stigma testaceous, making no mention of a pale spot at the inner angle. In the British example the intermediate coxæ are black at the base: the wings are ample, and tinged with dusky.* The terebra projects beyond the anus about $\frac{1}{4}$ of the length of the abdomen; if measured from the base it is longer. Wesmael's specimen was not in a condition to show the length of this organ, see *lib. cit.*, p. 62, note.

One ♀ was captured by Bignell near Plymouth.

27. *Apanteles lætus*, n. s.

Niger, palpis, pedibusque cum coxis, rufo-testaceis; tibiis posticis apice, tarsorumque articulis singulis præter basin, nigris. Abdomen vel rufo-testaceum, segmentis singulis disco plus minus nigricantibus; vel nigrum, ventris basi late testacea. Alæ hyalinæ, squamulis, costa, nervis, flavidis; stigma pallidum, flavo-cinctum. Mesothorax lævis, pubescens, iridescens; scutellum et metathorax lævia, nitida. Segmentum 1mum latitudine media sesquilongius, apicem versus subangustatum, truncatum, cum 2do leviter rugulosum; hoc 3tio brevius, 1mo latius; cætera lævia, nitida. Terebra abdominis quadranti æqualis, subdecurva, valvulis crassioribus. Valvula ventralis anum non superans, acuminata.

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* The dusky tinge is not noticed by Wesmael, who would have only pinned specimens for examination. The colour of wings can hardly be accurately seen, unless a piece of paper is held behind them, to form a white background.

Black; legs, with the coxæ, rufo-testaceous; hind tibiæ at the apex, and each joint of the tarsi, except at the base, black. Abdomen either rufo-testaceous, with the disk of each segment more or less black; or black, with the base of the belly broadly testaceous. Wings hyaline, squamulæ, costa, and nervures yellowish; stigma almost hyaline, with a yellow border. Mesothorax smooth, pubescent, iridescent; scutellum and metathorax smooth, shining. Segment 1 half as long again as its medial breadth, slightly narrowed towards the apex, truncated, slightly rugulose like 2, which is shorter than 3, broader than 1; the rest smooth and shining. Terebra $\frac{1}{4}$ of the abdomen, somewhat decurved, the valves incrassated. Valvula ventralis not surpassing the anus, acuminated. ♀. Length, $\frac{4}{5}$—1; wings, $1\frac{4}{5}$—$2\frac{2}{5}$ lin.

Described from six females. Antennæ almost as long as the body. Mandibles partly rufous. The variable abdomen is entirely black above in one specimen; in the others the 1st segment is narrowly bordered with testaceous, the following segments are testaceous with a black discal patch. Two of these specimens were returned by Reinhard as *punctiger*, Wesm. They are, however, much smaller, the 1st segment is not punctate, and differs in shape, the wings are more hyaline, the stigma yellow, and the hind coxæ testaceous. They are more like *punctiger*, Reinh., only too small. The difference between *punctiger*, Wesm., and *punctiger*, Reinh., is such that they are probably not identical.

Four specimens were bred by Fitch, July 24th, and seven by Elisha, July 17th, from *Gracilaria semifascia*, Haw.; two also by Elisha, July 31st, from *Eupœcilia ciliella*, Hüb.

28. *Apanteles adjunctus*, Nees.

Microgaster adjunctus, Nees, Mon., i., 176, ♀.
Apanteles adjunctus, Reinh., Berl. ent. Zeit., 1881, p. 36, ♀.

Black; mandibles, sides of segment 1, belly at the base, and legs, testaceous; hind coxæ black above; hind tibiæ tipped with fuscous. Wings dull hyaline, stigma and nervures fuscous. Mesothorax and scutellum somewhat shining, finely punctulate; metathorax also shining, slightly rugulose. Segment 1 rugulose, twice as long as its breadth, rounded behind, the sides parallel; 2 transverse, rugulose, smooth in the middle, scarcely half as long as 3; the rest smooth and shining. Terebra about $\frac{3}{5}$ of the abdomen, decurved, the valves compressed, subclavate. ♀. Length, $1\frac{3}{4}$; wings, $3\frac{2}{3}$ lin.

One of the largest of this section, and resembling *falcatus*, Nees, from which it may be separated by the broader 1st segment, and the hind coxæ, which are testaceous beneath. The terebra also is less curved, and the valvula ventralis more acute.

A single specimen was bred by Elisha from *Lioptilus microdactylus*, Hüb.

29. *Apanteles lictorius*, Reinh.

Microgaster ruficornis, Wesm., Nouv. Mém. Ac. Brux., 1837, p. 61, pl., f. H., ♂ ♀ (not of Nees).
Apanteles lictorius, Reinh., Berl. ent Zeit., 1881, p. 37, ♂ ♀.

Black; antennæ reddish underneath; mouth, squamulæ, sides of segment 1, belly at the base, and legs, rufo-testaceous; hind coxæ wholly, or at the base, black; hind tibiæ tipped with fuscous. Wings hyaline, stigma and nervures fuscous. Mesothorax and scutellum shining, very finely punctulate; metathorax also shining, slightly rugulose. Segment 1 rugulose, twice as long as its medial breadth, its hinder half narrowed, the apex truncate; 2 rugulose, half as long as 3; the rest smooth and shining. Terebra hardly shorter than the abdomen, nearly straight, the valves subclavate. ♂ ♀. Length, $1\frac{1}{4}$; wings, $3\frac{1}{2}$ lin.

According to Wesmael the antennæ of the ♂ are testaceous or ferruginous, more or less black above and at the apex. The ♀ sometimes has the antennæ and hind coxæ entirely pale; and the terebra is described as slender. As the two descriptions above referred to do not quite agree, there is some doubt as to the correctness of the synonymy; the British specimen, however, agrees with the characters given by Reinhard, in all important respects. It is an old discoloured ♀ communicated by Parfitt, and probably from Dorville's collection. Wesmael took ten males and five females near Brussels in June and July.

30. *Apanteles falcatus*, Nees.

Microgaster falcatus, Nees, Mon., i., 175, ♂ ♀ (not of Ratz.); *Apanteles falcatus*, Reinh., Berl. ent. Zeit., 1881, p. 37, ♂ ♀.

M. equestris, Hal., Ent. Mag., ii., 242, ♂ ♀.

Black; palpi pale; squamulæ, sides of segments 1—2 more or less, belly at the base, and legs, rufo-testaceous; coxæ black; middle coxæ ♀ tipped with testaceous; hind femora ♂ with a black line above; hind tibiæ tipped with fuscous. Wings hyaline, with a testaceous tinge; stigma and outer nervures fuscous, the inner yellowish. Mesothorax and scutellum shining, punctulate; metathorax more obscure. Segment 1 nearly three times longer than broad, finely punctured, shining; 2 half as long as 3, nearly smooth, with two channels converging towards the base; 3 often margined with testaceous posteriorly, and, with the rest, smooth and shining. Terebra shorter than the abdomen, decurved, the valves compressed and dilated, not clavate. ♂ ♀. Length, 2; wings, 4 lin.

One of the largest species. The valvula ventralis ♀ is obliquely truncate, not acuminate, nor reaching the anus. The antennæ of the ♂ are rather longer, of the ♀ shorter, than the body.

Common, gregarious; according to Haliday, frequenting the blossoms of the *jacobæa*. Bred by Bignell from *Xylophasia monoglypha*, Hufn., on July 24th. Cocoons white, regularly disposed side by side without an external covering. Reared by me numerously from a batch of these cocoons found in Leicestershire.

31. *Apanteles cultrator*, n. s.

Niger, palpis, ventris basi, pedibusque, testaceis; coxis nigris; femoribus intermediis supra, posticis supra et apice, infuscatis. Alæ hyalinæ squamulis stigmate nervis fuscis. Mesothorax confertissime punctulatus, parum nitidus; scutellum medio læve; metathorax rugulosus, nitidulus. Segmentum 1mum duplo longius quam latius, lateribus parallelis, truncatum, cum 2do rugulosum, nitidulum, hoc 3tio duplo brevius, sutura postica profundiore, 1mo latius; cætera lævissima, a 3tio inde fortiter compressa, cultrata. Terebra subexserta. Valvula ventralis maxima, cultrata, anum longe superans.

Black; palpi, belly at the base, and legs, testaceous; coxæ black; intermediate femora above, hind femora above and at the apex, infuscated. Wings hyaline, squamulæ, stigma, and nervures fuscous. Mesothorax very thickly punctulate, scarcely shining;

scutellum smooth in the middle; metathorax rugulose, rather shining. Segment 1 twice as long as broad, the sides parallel, truncate, rugulose, and somewhat shining, like 2, which is half as long as 3 and broader than 1; the rest smooth and shining; suturiform articulation strongly marked; all the segments after the 2d strongly compressed, cultriform. Terebra subexserted. Valvula ventralis very large, cultrate, much surpassing the anus. ♀. Length, 1¼; wings, 2¾ lin.

The form of the abdomen renders this species very distinct. The shining black ventral valve is almost as large as the rest of the abdomen, and with the short terebra projects considerably beyond the anus. Viewed from above, the abdomen is more compressed and acuminated than in any other species here described.

Two specimens, reared by Raynor from a hairy larva preserved on the same card, are in Fitch's collection. The white cocoons are four in number.

32. *Apanteles ultor*, Reinh.

Microgaster lactipennis, Ratz., Ichn. d. Forst., iii., 54, ♂ ♀ (not *lacteipennis*, Hal.).

Apanteles ultor, Reinh., Berl. ent. Zeit., 1881, p. 38, ♂ ♀.

Black, with fuscous palpi; legs testaceous, coxæ and upper trochanters black. Wings whitish, costa and stigma pale fusco-testaceous, the latter edged with fuscous; most of the nervures decolorous. Mesothorax and scutellum thickly punctulate, dull; metathorax rugulose with a smooth, margined, medial, area. Segment 1 a little longer than broad, margined, subcarinated in the middle, truncated at the apex, rugulose; segment 2 half as long as 3, and, with the rest, smooth and shining. Terebra ⅓ of the abdomen. ♂ ♀. Length, 1¼; wings, 3¼ lin.

This must not be mistaken for *xanthostigmus*, Hal., which has black femora.

A ♂ taken by Fitch at Maldon, August 25th, 1884, is the only specimen I have seen. It has been bred, according to Reinhard, from *Porthesia chrysorrhœa*, L., *P. similis*, Fues., and *Bombyx neustria*, L. Brischke says that he has reared it from *Acronycta psi*, L., and from the larva of a *Chrysopa*; adding that the cocoons are single or gregarious, cream-white or brownish yellow, surrounded by shining silk. More than one species seem to be here included.

33. *Apanteles decorus*, Hal.

Microgaster decorus, Hal., Ent. Mag., ii., 245, ♂ ♀; *Apanteles decorus*, Reinh., Berl. ent. Zeit., 1881, p. 38, ♀.

Black; palpi testaceous, fuscous at the base; belly and legs rufo-testaceous; hind coxæ and trochanters black; femora black at the base beneath, the hind pair also with a dark line above; hind tibiæ fuscous at the apex, the extreme base pallid, their tarsi mostly fuscous, the spurs pale. Wings hyaline, stigma fusco-ferruginous, squamulæ black. Mesothorax and scutellum very finely coriaceous, almost smooth, shining. Metathorax and segments 1—2 the same. Segment 1 a little longer than broad, its sides parallel, truncate at the apex; 2 half as long as 3, suturiform articulation curved; the other segments smooth, iridescent. Terebra as long as the abdomen, with the valves slightly dilated and compressed, straight nearly to the apex, afterwards a little decurved. Valvula ventralis acuminated, not surpassing the anus. ♂ ♀. Length, 1⅓; wings, 3¾ lin.

The legs are variable, sometimes fuscous, the fore femora and tibiæ beneath, the 4 posterior femora with a lateral line, and the base of their tibiæ, testaceous; the legs of the ♂ are usually darker than those of the ♀, and the antennæ much longer. The ♀ differs from that of *emarginatus*, Nees, in having the hind femora and trochanters testaceous, the antennæ and terebra longer, and the stigma unicolorous. Nevertheless, according to Haliday (MS. note in Brit. Mus.), his *decorus* and *annularis* are the same species; the latter is indistinguishable from *emarginatus*, Nees, whence it would follow that the three ought to be united. According to Reinhard, *decorus*, Hal., is distinct; *annularis*, Hal., and *emarginatus*, Nees, probably the same, and this opinion, which is supported by the appearance of the specimens, is here adopted.

Taken occasionally by Haliday on the oak and larch; a ♀ by me near Abergavenny. Bred by Elisha, two females and one male, from *Conchylis dilucidana*, Ste.; these males have the legs mostly testaceous. In Germany Möschler reared a ♀ from *Argyresthia Gœdartella*, L., feeding in catkins of the birch.

34. *Apanteles dilectus*, Hal.

Microgaster dilectus, Hal., Ent. Mag., ii., 246; *Apanteles dilectus*, Reinh., Berl. ent. Zeit., 1881, p. 38, ♀.

Black; palpi testaceous, fuscous at the base; mandibles rufous; antennæ at the base beneath, belly, and legs, rufo-testaceous; coxæ and tips of the hind tibiæ black; or the 4 posterior femora lineated with black above and beneath. Wings hyaline, stigma fuscous, pale testaceous at the inner angle; nervures also pale; squamulæ black. Antennæ ♀ stout to the apex, only the last joint acuminated. Mesothorax thickly and minutely punctulate, almost granulated, hardly shining; scutellum the same, smooth in the middle; mesopleuræ smooth and shining. Metathorax dull, granulated. Segment 1 half as long again as its breadth, with parallel sides, truncate at the apex, rugulose; 2 half as long as 3, granulated or coriaceous, with two lateral channels curving inwards near the base; suturiform articulation curved; the other segments subcoriaceous, hardly shining. Terebra $\frac{1}{2}$ the abdomen, or a little longer, the valves somewhat decurved. Valvula ventralis acuminated, not surpassing the anus. ♀. Length, $1\frac{1}{4}$; wings, $3\frac{1}{4}$ lin.

The 4 posterior femora are subject to be more or less black; and the middle tibiæ may be tipped with fuscous. Smaller than *decorus*, Hal., and distinguished by its bicolorous stigma and shorter terebra.

Bignell has bred three females singly from *Gracilaria syringella*, Fab. According to Reinhard, it has also been obtained on the Continent from a *Tortrix* feeding on *Syringa vulgaris*. Kriechbaumer reared it from a *Coleophora*, and Brischke considers himself to have bred it from a very different victim, *Leucoma salicis*, L.

35. *Apanteles xanthostigmus*, Hal.

Microgaster xanthostigma, Hal., Ent. Mag., ii., 244, ♂; *Apanteles xanthostigma*, Reinh., Berl. ent. Zeit., 1881, p. 40, ♂ ♀.

M. ochrostigma, Wesm., Nouv. Mém. Ac. Brux., 1837. p. 55, ♂ ♀; Ratz., Ichn. d. Forst., iii., 53.

Black; palpi pale, fuscous at the base; tibiæ at the base, fore tibiæ entirely, testaceous. Wings whitish, stigma yellowish or whitish with a fuscous border, costa and base of the radius testaceous, the other nervures decolorous. Mesothorax and scutellum minutely punctulate, almost smooth, shining; metathorax subgranulate, with a medial, depressed, margined area, which is often shining. Segment 1 half as long again as broad, with parallel sides, truncate at the apex, rimulose, with a smooth medial channel; 2 scarcely half as long as 3, and, with the rest, smooth and shining. Terebra a little shorter than the abdomen, somewhat decurved, the valves subclavate. Valvula ventralis acuminated, testaceous, surpassing the anus. ♂ ♀. Length, 1—1½; wings, 3—4½ lin.

Var. ♂. Femora testaceous, edged above and below with black; perhaps immature. Bred by Elisha from *Eupithecia exiguata*, Hüb.

Common; taken repeatedly by Bignell in Devonshire, by Fitch in Essex, and by me in Northamptonshire, Leicestershire, and Wiltshire. Bignell bred the male from *Diurnea fagella*, Fab.; Parfitt, two males from *Swammerdammia cæsiella*, Hüb.; Fitch, three males from *Gracilaria semifascia*, Haw., and two females from an unknown larva; Raynor, one male from *Hypsipetes trifasciatus*, Bork., and another from *Eupithecia exiguata*, Hüb. According to Ratzeburg, many were reared by Bouché from *Tortrix rosana*, L., and Reissig obtained a female from some species of *Psyche*. Brischke bred it from *Swammerdammia lutarea*, Haw. A solitary parasite. Cocoons white.

36. *Apanteles contaminatus*, Hal.

Microgaster contaminatus, Hal., Ent. Mag., ii., 245, ♀.

Black; palpi and legs testaceous; coxæ and trochanters black; fore femora at the base, middle except the apex, and hind pair entirely, black; hind tibiæ at the apex, and their tarsi except the base of the 1st joint, fuscous. Wings hyaline, squamulæ, stigma, and nervures, flavo-testaceous; costa, from the inner angle of the stigma to the tip of the wing, as also the base of the radius, fuscous. Head and mesothorax minutely punctulate, shining; scutellum smooth, the frenum on either side very shining; mesopleuræ thickly punctulate; metathorax rugulose. Abdomen obtuse, shorter than the thorax; segment 1 broad, subquadrate, with parallel sides, truncate, emarginate in the middle of the hinder edge, rugulose; 2 rugulose, very transverse, shorter than 3, suturiform articulation sinuated; the other segments smooth and shining. Terebra curved, extending about ½ the length of the abdomen; valves subclavate. Valvula ventralis acute, not reaching the anus. Spurs of hind tibiæ longer than ½ the metatarsus. ♀. Length, 1¼; wings, 3 lin.

The rugosity of the metathorax and segments 1—2 of the broadly sessile, obtuse abdomen, gives this species the aspect of a *Microgaster*. Haliday's description corresponds accurately, except that the terebra is insufficiently estimated as shorter than the body. *A. merula*, Reinh., Berl. ent. Zeit., 1881, p. 46, ♀, which he hesitated to join to this species, is widely different, having segments 1—2 smooth, the stigma fuscous, and the metathorax carinated.

One ♀ was found by Haliday in the Mourne Mountains, North Ireland. The 2 specimens here described were bred by W. H. B. Fletcher from an undetermined *Tineid*, mining the leaves of *Arctostaphylus uva-ursi*, the bearberry.

37. *Apanteles prætor*, n. s.

Ater, femoribus anticis apice, tibiis iisdem totis, posterioribus basi, ferrugineis. Alæ fusco-hyalinæ plaga sub stigmate limpida hoc nigro-fuscum macula interiore testacea. Radii abscissa 1ma curvata, cum nervo intercubitali 1mo angulum nullum fingens. Mesothorax et scutellum nitida, subtilissime parcius punctulata; metathorax subtiliter exaratus, fere opacus. Segmentum 1mum latitudine fere duplo longius, nitidum, marginatum, subrugosum, apice truncatum; 2dum 3tio vix duplo brevius, cum reliquis medio subcarinatum, læve. Terebra abdominæ paulo brevior, recta, valvis subclavatis.

Deep black; fore femora at the apex, their tibiæ entirely, and the other tibiæ at the base, ferruginous. Wings fusco-hyaline, with a limpid space under the stigma, which is dark fuscous, having a testaceous spot at the inner angle. First abscissa of the radius rounded, forming no angle with the 1st intercubital nervure. Mesothorax and scutellum shining, sparingly and very minutely punctulate; metathorax finely exarated, almost dull. Segment 1 about twice as long as its breadth, shining, margined, subrugose, truncate at the apex; 2 a little more than half as long as 3, smooth and subcarinated, as are also the remaining segments. Terebra a little shorter than the abdomen, straight, the valves subclavate. ♂ ♀. Length, 2; wings, 4¼ lin.

One of the largest species, and resembling *obscurus*, Nees; but the mesothorax is smooth, without the medial depressions, the stigma bicolorous, &c. From all the allied species it differs in the wings, as above described, the upper angle of the 2d cubital areolet not being indicated.

Described from two males taken by Bignell in S. Devon; and one female bred by Elisha, Sept. 4th, from *Catoptria æmulana*, Schl.

38. *Apanteles emarginatus*, Nees.

Microgaster emarginatus, Nees, Mon., i., 182, ♀; Wesm., Nouv. Mém. Ac. Brux., 1837, p. 56, ♀; Ratz., Ichn. d. Forst., iii., 53, ♀.
Apanteles emarginatus, Reinh., Berl. ent. Zeit., 1881, p. 41, ♂ ♀.
Microgaster annularis, Hal., Ent. Mag., ii., 244, ♂ ♀.
Apanteles annularis, Reinh., *lib. cit.*, p. 40, ♂ ♀.
Microgaster hilaris, Hal., Ent. Mag., ii., 245, ♀.

Black, sericeous, iridescent; palpi, sides of the belly, and 4 anterior legs, flavo-testaceous; coxæ black; intermediate femora more or less infuscated at the base; base of the hind tibiæ and tarsi flavo-testaceous. Wings whitish hyaline; stigma fuscous, with a pale spot at the inner angle; outer nervures decolorous, the rest pale testaceous; squamulæ variable. Mesothorax very minutely punctulate, somewhat shining; scutellum smooth; metathorax rugulose, with a medial channel. Segment 1 twice as long as broad, margined, aciculated, broadly rounded at the apex; 2 transverse, about one-third as long as 3, aciculated; the rest smooth and shining. Terebra shorter than the abdomen, slightly decurved. Valvula ventralis not surpassing the anus. ♂ ♀. Length, 1¼; wings, 3¼ lin.

The black markings of the legs vary in extent, as usual; the pale spot in the stigma is liable to be obliterated. The squamulæ vary from black to testaceous. The mesothorax, as to punctuation and gloss, offers no tangible differences. The antennæ of the ♀ are about as long as the body, of the ♂ longer, as remarked by Haliday under *annularis*; but Reinhard makes them the same length as those of the other sex.

Taken commonly by me near Teignmouth and Abergavenny; also in Epping Forest. Bred by Bignell, Aug. 2nd, from *Depressaria nervosa*, Haw.; a ♀ by W. H. B. Fletcher from *D. carduella*, Hüb., July 18th; a ♀ by Raynor, June 27th, from an undetermined *Tortrix*-larva on chamomile, and, June 3rd, from *Conchylis dilucidana*, Ste. From the *Tortrix*-larva issued a second and very different parasite, *Microgaster tiro*, Reinh. *A. annularis* was bred in Germany, according to Reinhard, from *Gracilaria rufipennella*, Hüb., and *Fribergensis*, Fritzsche. *A. emarginatus*, according to Ratzeburg, from *Psyche*-cases; according to Reinhard, from *Depressaria chærophylli*, Zell. Cocoons white, papyraceous, without gloss.

39. *Apanteles obscurus*, Nees.

Microgaster obscurus, Nees, Mon. i., 182, ♂ ♀; Wesm., Nouv. Mém. Ac. Brux., 1837, p. 58, ♂ ♀; *Apanteles obscurus*, Reinh., Berl. ent. Zeit., 1881, p. 41, ♂ ♀.
M. arenarius, Hal., Ent. Mag., ii., 246, ♂ ♀.

Black; apex of palpi, and tibiæ ♀, ferruginous, the hind pair fuscous at the apex; those of the ♂ are generally ferruginous only at the base. Wings dusky hyaline, stigma fuscous, all the nervures visible. Mesothorax and scutellum thickly punctulate, shining, the former subtrilobate, the sutures ending before the scutellum in two rugulose depressions; ante-scutellar fovea large, crenated. Metathorax rugose. Segment 1 a little longer than broad, acutely margined, truncate, rugose like 2, which is not half as long as 3; the rest smooth and shining. Terebra less than ½ the length of the abdomen; valves subclavate, hardly decurved. ♂ ♀. Length, 1½—2; wings, 3½—4⅓ lin.

A robust species, often as large as *falcatus*, Nees, and much resembling a *Microgaster*, except in the wings. According to Haliday the valvula ventralis ♀ is pale, and considerably surpasses the anus, but these characters do not appear in the ♀ above described, nor are they noticed by Nees and Reinhard. The antennæ of the ♂ are longer than the body, the fore tibiæ sometimes fuscous in the middle, and the hind tibiæ more broadly fuscous than in the ♀.

Taken by Haliday in numbers on *Salix argentea* near the sea-shore; I captured a ♂ at Niton, Isle of Wight. Bignell bred the ♂ July 12th, and the ♀ July 30th, from *Ebulea crocealis*, Hüb. A solitary parasite. Cocoons silvery white. Giraud, doubtless erroneously, gives it as a parasite of *Trypeta arnicæ*, Meig.

40. *Apanteles viminetorum*, Wesm.

Microgaster viminetorum, Wesm., Nouv. Mém. Ac. Brux., 1837, p. 50, ♀.
Apanteles viminetorum, Reinh., Berl. ent. Zeit., 1881, p. 42, ♀.

Black; fore tibiæ entirely, and the others at the base, testaceous. Wings subhyaline, stigma blackish, nervures fuscous, the outer decolorous. Thorax shining, punctulate. Segment 1 almost twice as long as broad, somewhat narrowed posteriorly, truncate, finely aciculated, the base smooth and shining; segment 2 half as long as

3, broader than 1, with two basal impressions, and, like the rest, smooth and shining. Terebra as long as $\frac{1}{4}$ of the abdomen, the valves compressed and, viewed laterally, very stout. ♂ ♀. Length, 1; wings, $2\frac{2}{3}$ lin.

Three males were bred by Bignell, singly, from *Elachista magnificella*, Tengström, June 30th. Two males and two females by W. H. B. Fletcher from *Lita instabilella*, Dougl. According to Reinhard, also bred from *Elachista adscitella*, Staint., and from mines of *E. airæ*, Staint., on *Aira cæspitosa*. Cocoons glossy white.

41. *Apanteles sodalis*, Hal.

Microgaster sodalis, Hal., Ent. Mag., ii., 246, ♀; *Apanteles sodalis*, Reinh., Berl. ent. Zeit., 1881, p. 42, ♂ ♀.

Black; base of the belly pitchy, subpellucid; tibiæ, apex of fore femora, and base of 4 posterior tibiæ, rufo-testaceous, in the ♂ more narrowly. Wings whitish hyaline, stigma dull stramineous, or testaceous, with a fuscous border. Mesothorax and scutellum punctulate, shining; metathorax rugulose. Segment 1 twice longer than broad, with parallel sides, truncate, rugulose; 2 broader than 1, half as long as 3, and, with the remaining segments, smooth and shining. Terebra as long as $\frac{1}{2}$ the abdomen; valves subclavate. Valvula ventralis not surpassing the anus. ♂ ♀. Length $1\frac{1}{3}$; wings $3\frac{1}{4}$.

Haliday had only one ♀, which he compares with *obscurus*, Nees, probably a small specimen. The pale stigma of *sodalis* somewhat resembles that of *xanthostigmus*, Hal., but the latter insect has the mesothorax more shining, and the 1st segment broader.

Four males and seven females were bred, April 21st, by C. J. Boden, from *Solenobia inconspicuella*, Staint. I captured a male and two females in Birch Wood, and a ♀ near Teignmouth. Parfitt has also taken the species at Exeter. According to Reinhard it has been reared by R. v. Stein, in Bohemia, from a *Tortrix* feeding on the alder. Brischke also bred it from a *Tortrix*. Cocoons white, silky, gregarious, and surrounded with wool.

42. *Apanteles albipennis*, Nees.

Microgaster albipennis, Nees, Mon., i., 186, ♂ ♀; Ratz., Ichn. d. Forst., ii., 52, ♀ (not of Hal.).
M. lacteipennis, Hal., Ent. Mag., ii., 244, ♂ (not *lactipennis*, Ratz.).
Apanteles albipennis, Reinh., Berl. ent. Zeit., 1881, p. 43, ♂ ♀.

Deep black; legs coloured as in the last species. Wings milky-white, costa and stigma black, the latter usually with a pale dot at the inner angle. Mesothorax shining, minutely punctulate; scutellum smooth in the middle, punctulate at the sides; metathorax shining, slightly punctulate. Segment 1 hardly longer than broad, shining at the base, subrugulose and with a few punctures towards the broadly truncate apex; 2 not a quarter as long as 3, and, like the rest, smooth and shining. Terebra a little shorter than the abdomen; valves subclavate. Valvula ventralis not reaching the anus. ♂ ♀. Length 1½; wings 4 lin.

Distinguishable from the other white-winged species by greater size and longer terebra, as also by the testaceous dot usually seen at the base of the stigma. In the hind wings the apex of the subcostal nervure is distinctly fuscous.

Rather common. Bred by Bignell, June 22nd, from *Lioptilus microdactylus*, Hüb., emerging after the victim-larva has taken up its winter-quarters in the stem of *Eupatorium cannabinum.* Kaltenbach reared from the same plume-moth an *Apanteles* identified by him with *Microgaster lævigator*, Ratz. = *hoplites*, Ratz. Although *hoplites*, Ratz., is sufficiently distinct from *albipennis*, Nees, there is nothing to show this in Ratzeburg's description; and hence it may be surmised with great probability that Kaltenbach's insect belongs to the present species. Obtained by Elisha, July 31st, from *Lita tricolorella*, Haw., one male, five females; a female from *Conchylis Francillana*, Fab.; five males, seven females from *Eupœcilia ciliella*, Hüb.; one male, two females from *Douglasia ocnerostomella*, Staint., July 6th; and three males from *Catoptria æmulana*, Schl., August 16th. Brischke bred it probably from *Ergatis Brizella*, Tr. Three males were taken by me at Barnstaple, and another at Niton, Isle of Wight. Reinhard mentions the existence, in Mayr's collection at Vienna, of a series of this species bred from galls of

Andricus multiplicatus, Gir. But according to Giraud (Verh. z.-b. Ges. Wien., 1859, p. 360), *Ephippiophora costipunctana*, Haw., occurs frequently in the same galls. It is therefore more probable that the *Apanteles* is a parasite of the moth, than of the *Cynips*. A solitary parasite. Cocoons glossy white.

43. *Apanteles impurus*, Nees.

Microgaster albipennis, var. β., Nees, Mon., i., 187, ♂ ♀ (according to Haliday, MS. in Brit. Mus.).
M. candidatus, Hal., Ent. Mag., ii., 243, ♂ ♀.
M. impurus, Nees, Mon., i., 187, ♂ ♀; Wesm., Nouv. Mém. Ac. Brux., 1837, p. 53, pl., fig. G, ♂ ♀; Ratz., Ichn. d. Forst., ii., 51, ♀.
Apanteles impurus, Reinh., Berl. ent. Zeit., 1881, p. 43.

Black; palpi fuscous; fore tibiæ, fore femora at the apex, middle and hind tibiæ at the base, flavo-ferruginous. Wings white, stigma nigro-piceous, nervures in the middle testaceous, elsewhere decolorous; costa pale at the base. Thorax punctulate, shining. Segment 1 half as long again as broad, truncate, margined, with parallel sides, slightly aciculated; segment 2 short, broader than 1, and, with the following segments, smooth and shining. Terebra ½ as long as the abdomen, valves slender, scarcely curved. ♂ ♀. Length 1¼; wings 3 lin.

Similar to the last species, but smaller: the 1st abdominal segment is narrower, the terebra shorter, and not clavate.

Common in the Isle of Wight in August; Devonshire; Northants; Kent, &c. Bred by Bignell from *Tortrix Forsterana*, Fab., three males, two females. According to Ratzeburg, obtained from apple-blossoms inhabited by a Curculio, *Anthonomus pomorum*, L. According to Reinhard, from *Gracilaria syringella*, Fab., and from the heads of thistles. Brischke reports that he bred this species from *Lycæna Corydon*, Fab., and *Eupithecia sobrinata*, Hüb.; the cocoons are described as single, and woolly, that from the *Lycæna* white, from the *Eupithecia*, yellow; a difference which seems to indicate some confusion of species, for no *Apanteles* of this section makes yellow cocoons. Cocoons white, with a satiny gloss, like those of *albipennis*, Nees; several joined together by a few threads.

44. *Apanteles naso*, n. s.

Niger, obscurus, ventris basi concolore, palpis fuscis, geniculis anticis, tibiis posterioribus basi, testaceis. Alæ subinfuscatæ, squamulis, stigmate, nervis, nigro-fuscis. Clypeus elongatus, unde facies antice triangularis, in rostri speciem producta. Caput cum mesothorace ob puncturam subtilissimam coriaceum, haud nitidum; scutellum paulo lævius; metathorax rugulosus. Segmentum 1mum latitudine media duplo longius, apicem versus perpaulo angustatum, truncatum, aciculatum; 2dum dimidio brevius quam 3tium, levissime aciculatum, utrinque arcuato-impressum, medio carinulatum; cætera læviuscula, parum nitida. Abdomen breve, lanceolato-compressum, forcipe anali exserto. Coxæ posticæ læviusculæ. Calcaria postica metatarsi dimidio breviora.

Black, not shining; base of the belly concolorous; knees of the fore legs, and base of the 4 posterior tibiæ, testaceous. Wings somewhat dusky; squamulæ, stigma, and nervures, blackish. Clypeus and face elongate, triangular, produced into an obtuse rostrum. Head and mesothorax very minutely punctulate, or coriaceous, not shining; scutellum somewhat smoother; metathorax rugulose. Segment 1 twice as long as its medial width, very slightly narrowed towards the apex, truncated, aciculated; 3 twice as long as 2, the latter faintly aciculated, having on each side a curved impression, and in the middle an indistinct carina; the other segments smoother, but not shining. Abdomen short, lanceolate, compressed; the anal forceps exserted. Hind coxæ rather smooth. Spurs of hind tibiæ shorter than ½ the metatarsus. ♂. Length 1; wings 2½ lin.

Reinhard has described two species, *vipio* and *longipalpis*, having the oral parts produced into a rostrum, as in the genera *Vipio* and *Agathis*; but the present insect is distinct from both. The prolongation of the face, measured from the eyes, is about equal to the greatest length of one eye. The maxillary palpi are not longer than usual. The whole body is without gloss, except three smoother lines on the mesothorax, and the scutellum. The abdomen is short, narrow, and compressed. The wings are infuscated as in *infimus*, Hal.; not so deeply as in *gagates*, Nees.

I found this ♂ on the sand-hills at the mouth of the Exe, opposite Star-Cross, Devon.

45. *Apanteles infimus*, Hal.

Microgaster infimus, Hal., Ent. Mag., ii., 243, ♂ ♀.
Apanteles infimus, Reinh., Berl. ent. Zeit., 1881, p. 44, ♂ ♀.

Black; tibiæ at the base rufo-testaceous. Wings fusco-hyaline, stigma blackish, nervures fuscous, distinct, except the base of the radius. Mesothorax minutely punctulate, and, with the scutellum, shining. Metathorax rugulose. Segment 1 subquadrate, faintly margined, truncated, rugulose, narrower than 2, which is half as long as 3, and smoother than 1, having only a few wrinkles; the rest are smooth, sericeous, iridescent. Terebra about ½ as long as the abdomen, the valves stout, nearly straight. Valvula ventralis pallid, acuminated, not surpassing the anus. ♂ ♀. Length, 1—1¼; wings, 3—3¾ lin.

The dusky wings distinguish this species from *fuliginosus*, Wesm. From *viminetorum*, Wesm., it differs in having the 1st segment broader, not twice as long as wide, and more rugulose; the wings are more distinctly infumated. The rugulosity of the 2d segment is a doubtful character, varying in different individuals, and hence the difficulty of distinguishing by their descriptions the four species *tenebrosus*, Wesm., *fuliginosus*, Wesm., *infimus*, Hal., and *viminetorum*, Wesm. Of the first of these I have not seen any British example: those sent to me with the name *tenebrosus*, in Fitch's collection, have all dusky wings, and must be referred to the present species.

Five more in the same collection are labelled as having been bred from *Acrolepia pygmæana*, Haw. The only reason that hinders them from being considered the same as *Microgaster ensiformis*, Ratz., i., 70 (also from *A. pygmæana*) is that the terebra of the latter is as long as the abdomen. Reared by Elisha, one male and two females, from *Chauliodus chærophyllellus*, Göze, Sept. 4th. I captured two pairs at Nunton, Salisbury, on Sept. 1st. Stated to have been bred by Brischke from *Pseudoterpna pruinata*, Hufn., and *Butalis noricella*, Zell.; "cocoons gregarious, yellow, woolly": the colour assigned renders some mistake probable.

46. *Apanteles exilis*, Hal.

Microgaster exilis, Hal., Ent. Mag., ii., 247, ♀.
Apanteles exilis, Reinh., Berl. ent. Zeit., 1881, p. 44, ♂ ♀.

Black; belly pitchy at the base; apex of the palpi pale; fore femora except at the base, middle femora at the apex, fore tibiæ, and 4 posterior tibiæ at the base, testaceous. Wings subhyaline, stigma dull testaceous. Thorax shining, punctulate. Segment 1 elongate, more than twice longer than broad, with parallel sides, broadly rounded behind, punctulate; 2 short, with two lateral oblique channels, smooth and shining like the rest of the segments. Terebra shorter than ½ the abdomen; valves linear, straight. ♂ ♀. Length, 1⅓; wings, 2¾ lin.

Differs from all the preceding in the linear and narrow shape of the 1st abdominal segment, which is not, however, attenuated posteriorly, as in the IVth Section. Brischke says "bred from a *Tortrix*; cocoons gregarious, white, woolly."

One ♂ was taken by me in Birch Wood.

47. *Apanteles gagates*, Nees.

Microgaster gagates, Nees, Mon., i., 183, ♀; Wesm., Nouv. Mém. Ac. Brux., 1837, p. 57, ♀.
Apanteles gagates, Reinh., Berl. ent. Zeit., 1881, p. 45, ♂ ♀.

Deep black; fore femora at the apex, fore tibiæ at the base or along the inside, and sometimes middle tibiæ at the base, testaceous. Wings fuscous, with a pale streak under the black stigma, nervures fuscous, distinct. Mesothorax and scutellum smooth, shining; metathorax the same, with a few scattered punctures, and subrugulose in the middle. Segment 1 of the ♂ a little longer than broad, of the ♀ quadrate, truncate, margined, rugulose at the apex; 2 much shorter than 3, and, with the others, smooth and shining. Body thinly clothed with short black hairs. Terebra a little shorter than the abdomen, with compressed subclavate valves, decurved at the apex, hairy. Valvula ventralis not surpassing the anus. ♂ ♀. Length, 1⅔; wings, 3¾ lin.

This fine species was first discovered to be British by Bignell, who took several of both sexes near Plymouth, Aug. 21st, 1884; and on Aug. 29th—30th I captured three males by sweeping a hedge at Nunton, near Salisbury. According to Reinhard it has been bred from *Mimescoptilus bipunctidactylus*, Haw.; and also from flowers of the scabious.

48. *Apanteles Halidaii.*

Microgaster albipennis, Hal., Ent. Mag., ii., 243, ♂ ♀ (not of Nees and Ratz.).

Black; palpi pale, the 1st joint of the maxillary more or less fuscous; apex of fore femora, their tibiæ, and base of the posterior tibiæ, testaceous. Wings whitish hyaline, stigma pale with a fuscous border, or fuscous with the inner angle pale; costa fuscous, most of the nervures decolorous. Elongate, slender; mesothorax almost invisibly punctulate; scutellum smooth; metathorax punctulate; abdomen smooth and shining; segment 1 one-half longer than broad, punctulate towards the apex, margined, truncate; 2 half as long as 3; suturiform articulation curved, convex posteriorly. Abdomen ♀ at the apex acute, lanceolate. Terebra as long as the abdomen, falcate, the valves compressed. Valvula ventralis elongate, testaceous, acute, surpassing the anus. Anal forceps of the ♂ exserted. ♂ ♀. Length, ♂ 1; wings, $2\frac{1}{3}$: ♀ $1\frac{1}{4}$—$1\frac{1}{3}$; wings, $2\frac{3}{4}$—3 lin.

Most like *albipennis*, Nees, but much smaller, more slender, with a differently coloured stigma and longer terebra. The stigma is variable, either pale flavo-piceous bordered all round with fuscous, or fuscous with the inner angle pale; the former variety was that known to Haliday; the latter differs in no other respect, and certainly belongs to the same species. Haliday compares it with his *candidatus*, i.e., *albipennis*, var. *β*, Nees, saying that it is one-half smaller, which is correct, but the insects are otherwise sufficiently distinct. The present species is easily recognised. It seems to be uncommon in England, and was not known to Reinhard.

Described from two females bred by W. H. B. Fletcher, of Worthing, from *Ptocheuusa inopella*, Zell.; their stigma is pale in the middle; two males and five females reared by the same at the end of July from *Coleophora limoniella*, Staint. (*cf.* E. M. M., 1884, p. 60); and a pair from *Gracilaria ononidis*, Zell.; their stigma is darker, with a pale basal dot.

49. *Apanteles coniferæ*, Hal.

Microgaster coniferæ, Hal., Ent. Mag., ii., 247, ♂ ♀.

♀. Black; palpi, tibiæ, tarsi, and fore femora, flavo-testaceous; coxæ black; intermediate femora with an abbreviated black line above and below; hind femora fuscous with a testaceous lateral stripe, or wholly fuscous; hind tibiæ at the apex, with their tarsi, infuscated. ♂. Fore femora with a fuscous line above, the others almost entirely fuscous. Wings hyaline, squamulæ, stigma, and nervures flavo-testaceous; stigma with a pale fuscous border; exterior nervures colourless. Mesothorax smooth, sericeous, iridescent; scutellum and metathorax smooth, shining, the latter with some faint wrinkles. Segment 1 twice as long as broad, the sides parallel nearly to the apex (which is obtusely rounded), smooth and shining, minutely aciculated towards the apex; 2 shorter than 3, bifoveated in front, and, like the remaining segments, smooth and shining. Terebra hardly $\frac{1}{4}$ of the abdomen; the valves clavate. Valvula ventralis not surpassing the anus. ♂ ♀. Length, $1\frac{1}{2}$; wings, 3 lin.

Antennæ ♀ as long as the body. Belly entirely black and shining. I have only seen one ♀, in Fitch's collection, which agrees fully with the description, except that, whereas Haliday states the size to be equal to that of *glomeratus*, L., the present individual is somewhat larger.

Found by Haliday among larch trees, but rarely.

50. *Apanteles lineipes*, Wesm.

Microgaster lineipes, Wesm., Nouv. Mém. Ac. Brux., 1837, p. 57, ♀.

Black; apex of palpi, a line on each side of the femora, fore tibiæ, middle tibiæ entirely or (like the hind pair) at the base only, testaceous; hind tarsi fuscous. Wings hyaline, stigma and nervures dark fuscous. Mesothorax very minutely punctulate, shining; scutellum, metathorax, and abdomen smooth and shining. Segment 1 half as long again as broad, with parallel sides, margined, truncate; 2 half as long as 3. Terebra as long as the abdomen, nearly straight; valves subclavate. ♀. Length, $1\frac{1}{2}$; wings, $3\frac{1}{2}$ lin.

Reinhard (Berl. ent. Zeit., 1881, p. 45) describes a species *lineatus*, which he says is very near *lineipes*, Wesm., differing only in smaller size, and in having a fusco-testaceous stigma. Wesmael gives the length of *lineipes* as $1\frac{3}{4}$ lin., in which respect only the British specimen fails to agree with the description. As the stigma is dark fuscous, I have not referred it to Reinhard's insect; though it is very probable that the two species ought to be united.

Two females are in Cameron's collection, taken in Cadder Wilderness, near Glasgow.

51. *Apanteles longicaudis,* Wesm.

Microgaster longicauda, Wesm., Nouv. Mém. Ac. Brux., 1837, p. 54, ♀ (not of Ratz.)
Apanteles longicauda, Reinh., Berl. ent. Zeit., 1881, p. 45, ♂ ♀.
Microgaster terebrator, Ratz., Ichn. d. Forst., iii., 52.

Black; belly pitchy at the base; palpi, fore femora at the apex, and their tibiæ, middle and hind tibiæ at the base, pale testaceous. Wings whitish hyaline, somewhat greyish towards the tips, stigma and nervures fuscous, the latter distinct. Mesothorax very finely punctulate, rather shining; metathorax finely and thickly punctulate, or more or less smooth; scutellum and abdomen smooth, somewhat shining, especially the former. Segment 1 longer by one-half than its breadth, with parallel sides, truncate, sometimes coriaceous and dull towards the apex; 2 half as long as 3. Terebra as long as the abdomen, scarcely curved; valves almost linear. ♂ ♀ Length, 1½—2; wings, 3½—4⅔ lin.

I nave seen no ♀, and only 1 ♂, in Fitch's collection, which was named by Reinhard. Ratzeburg reared the species in some numbers from *Recurvaria leucatella,* Clerck; and Hofmann, at Stuttgart, from *Atemelia torquatella,* Lien.

52. *Apanteles fuliginosus,* Wesm.

Microgaster fuliginosus, Wesm., Nouv. Mém. Ac. Brux., 1837, p. 52, ♂ ♀ (not of Ratz.)
Apanteles fuliginosus, Reinh., Berl. ent. Zeit., 1881, p. 46, ♂ ♀.

Black; palpi at the apex, 4 anterior femora at the apex sometimes, their tibiæ wholly or at the base, and hind tibiæ at the base, testaceous. Wings hyaline, stigma dark fuscous, nervures paler but distinct, except the base of the radius. Mesothorax minutely punctulate and, with the scutellum, shining. Metathorax slightly rugulose, or smooth. Segment 1 a little longer than broad, with parallel sides, broadly truncate, punctulate, smooth at the base; 2 shorter than 3, and like the rest, smooth, sericeous, iridescent. Terebra ¼ abdomen, nearly straight; valves clavate. ♂ ♀ Length, 1—1¼; wings, 3—3¾ lin.

This species must be distinguished from *viminetorum,* Wesm., which has the 1st segment narrower, and attenuated towards the apex; and the 2d segment rugulose. From *infimus*, Hal., it may be known by the hyaline wings.

Two males and three females were bred by Bignell from *Gracilaria syringella*, Fab.; he has also captured the ♂. According to Giraud the species has been bred by Heeger from *Lyonetia Clerkella*, L. (?) A solitary parasite. Cocoons silky white, semitransparent.

53. *Apanteles sicarius*, n. s.

Niger, palpis, femorum anticorum apice, tibiis anticis, posteriorumque basi late, testaceis; maris tibiis anticis medio infuscatis. Alæ ♂ hyalinæ, ♀ levissime infumatæ, stigmate costa radiique basi nigricantibus, nervis cæteris fuscis, omnibus distinctis. Caput cum thorace nitidum, læve, omnium subtilissime punctulatum. Abdomen læve, nitidum, supra planum; segmentum 1mum subtiliter punctulatum, sesquilongius quam latius, truncatum, marginatum, lateribus parallelis; 2dum 3tio duplo brevius, lineis duabus lateralibus antrorsum in baseos foveas triangulares convergentibus impressum; cætera lævia; articulatio suturiformis curvata, postice convexa. Terebra abdominis dimidio æqualis, vel paulo longior, valvis compressis, fortiter clavatis. Valvula ventralis acuta, testacea, anum superans. Tibiarum posticarum calcaria metatarsi dimidio breviora.

Black; fore femora at the apex, their tibiæ, and the posterior at the base broadly, testaceous; fore tibiæ of the ♂ infuscated in the middle. Wings ♂ hyaline, ♀ very slightly infumated, stigma, costa, and base of radius, blackish, the other nervures fuscous, all distinct. Head and thorax smooth, shining, with almost invisible punctulation. Abdomen flat above, smooth and shining; segment 1 minutely punctulate, ½ longer than its breadth, with parallel sides, truncate, margined; 2 half as long as 3, more strongly margined by two impressed lines curving inwards to a pair of triangular basal foveæ; the rest smooth; suturiform articulation curved, convex posteriorly. Terebra ½—⅔ abdomen; the valves compressed and strongly clavate. Valvula ventralis acute, surpassing the anus, testaceous. Spurs of hind tibiæ shorter than ½ the metatarsus. ♂ ♀. Length, 1½; wings, 3¼ lin.

The ♂ is hardly distinguishable from the ♂ *longicaudis*, Wesm., determined by Reinhard: in the latter, however, the fovea at the base of the scutellum is obsolete, and most of the nervures decolorous; in *sicarius* the fovea is distinct, and all the nervures at least visible. The ♀ of *longicaudis* is at once known by the terebra, which is as long as the abdomen.

Two males and four females were discovered by Bignell at Bolt Head, Devon, in July; and a ♂ was bred by him from *Diasemia literata*, Scop.

SECTION III.

54. *Apanteles octonarius*, Ratz.

Microgaster octonarius, Ratz., Ichn. d. Forst., iii., 52, ♀.
Apanteles octonarius, Reinh., Berl. ent. Zeit., 1881, p. 35, ♂ ♀.

Black; palpi pale; antennæ beneath towards the base fusco-ferruginous; belly at the base, and legs (except the coxæ and upper trochanters), rufo-testaceous; segments 1—2 margined laterally with the same colour; hind femora sometimes dusky at the tips, or with a fuscous line beneath, or nearly all fuscous; hind tibiæ darker at the apex. Wings hyaline, squamulæ and stigma fuscous, nervures fusco-testaceous. Mesothorax and scutellum nearly smooth, and, like the whole body, shining; metathorax rugulose; pleuræ smooth. Segment 1 longer by ½ than its breadth, very slightly narrowed at the base, subrugulose at the sides and apex, broadly truncate; 2 transverse, shorter than 3, with two impressed lines converging towards the base, and enclosing a smooth subtriangular space. Terebra very short. Valvula ventralis not surpassing the anus. Hind coxæ smooth. Spurs of the hind tibiæ longer than ½ the metatarsus. ♂ ♀. Length, 1⅓; wings, 3 lin.

Distinguished from all other species of Section III. by the rugulose metathorax.

Bignell reared 4 males and 3 females, July 23, from a larva of *Notodonta ziczac*, L., and Bridgman has taken both sexes at Norwich. In Germany Ratzeburg obtained 8 females at the end of May from a half-grown larva of *Gnophria quadra*, L., found on a beech tree. Observing 4 maggots arranged symmetrically on each side of the victim, and which appeared to be sucking it, he at first supposed them to be external parasites. "Very likely," he says, "I found the caterpillar just after the *Microgasters* had bored their way out of it. In about seven days the perfect insects appeared." According to Reinhard this species has frequently been reared from *Lithosia complana*, L., and *Tortrix rosana*, L.; from the latter host by Brischke, who adds, "cocoons united in a flocky white heap." Cocoons white, faintly tinged with lemon-colour.

55. *Apanteles abjectus*, n. s.

Niger; venter basi concolor; palpi pallidi; pedes cum trochanteribus inferis testacei; coxæ nigræ; femora posteriora supra et infra fusca, vel fusca, plaga media testacea; tibiæ posticæ apice ipso cum tarsis infuscatæ. Alæ hyalinæ squamulis stigmate nervis fuscis. Corpus totum læve, nitidiusculum; abdominis segmentum 1mum solito latius, latitudine haud longius, truncatum, sutura inter hoc et 2dum profundius biimpressa; 2dum transversum, 3tio brevius, lineis duabus obliquis lateralibus antrorsum convergentibus impressum. Terebra brevissima. Valvula ventralis anum non superans. Coxæ posticæ læves. Calcaria postica metatarsi dimidio paulo longiora.

Black; base of the belly concolorous; palpi pale; legs, including the lower trochanters, testaceous; coxæ black; posterior femora fuscous above and beneath, or fuscous with a testaceous medial streak; hind tibiæ at the extreme apex, as well as their tarsi, infuscated. Wings hyaline, squamulæ, stigma, and nervures fuscous. Body entirely smooth, somewhat shining; segment 1 uncommonly wide, not longer than its width, truncate, the suture between it and segment 2 with a deep double impression; 2 transverse, shorter than 3, impressed with two oblique lateral lines, which converge forwards. Terebra very short. Valvula ventralis not surpassing the anus. Hind coxæ smooth. Spurs of the hind tibiæ a little longer than ½ the metatarsus. ♀. Length, 1; wings, 2¾ lin.

This resembles *octonarius* in having the 2d segment shorter than the 3d, but the 1st segment is broader and shorter, the metathorax smooth, and the cocoons different. It answers to the description of *Microgaster nigriventris*, Nees, Mon., i., 178, except that the 2d cubital areolet of that species is said to be subinchoate, a difference of structure which forbids the union of the two.

Two females were bred by Bignell, May 27, from *Lophopteryx camelina*, L. Three males and four females are in Fitch's collection, bred from *Notodonta dromedarius*, L.; and four males, two females, bred from an unknown victim by F. Norgate; also three males and two females bred from *Notodonta dictæoides*, Esp., taken in the New Forest by Norgate, in Bridgman's collection. Cocoons brownish white.

56. *Apanteles immunis*, Hal.

Microgaster immunis, Hal., Ent. Mag., ii., 250, ♀.

Black; palpi pale, sometimes dusky at the base; belly at the base, femora, and tibiæ, flavo-testaceous; coxæ and upper trochanters black; middle femora with a blackish line above and below; hind femora blackish, with a longitudinal testaceous stripe; posterior tarsi, and hind tibiæ at the apex, fuscous. Wings hyaline, squamulæ, costa, and stigma fuscous. Thorax and pleuræ almost smooth: mesothorax iridescent; metathorax very minutely and sparingly rugulose. Segment 1 almost twice as long as broad, hardly rounded at the sides, truncated, smooth at the base, minutely aciculated towards the apex; that of the ♂ narrower, quite twice as long as broad, and smoother; 2 as long as 3, with two oblique impressed lines converging forwards and enclosing a subtriangular aciculated space; suturiform articulation marked with two impressions; the rest of the abdomen smooth and shining. Terebra very short. Valvula ventralis not surpassing the anus. Hind coxæ smooth. Spurs of hind tibiæ equal to half the metatarsus. ♂ ♀. Length, $1\frac{1}{3}$; wings, $3\frac{1}{3}$ lin.

Var. ♀. Abdominal segments 1—3 bordered with testaceous, 3 more broadly; legs without fuscous marks.

The dark lines on the femora are variously developed in 11 specimens, sometimes obliterated on the intermediate pair, on the hind pair always more or less present. The ♂ is much more slender than the ♀, and the antennæ are longer than the body.

A solitary parasite of Geometræ. Bred by Bignell from *Pseudoterpna pruinata*, Hufn., male, July 20; *Hybernia marginaria*, Bork., and *H. leucophæaria*, Schiff., females, June 23; *Cheimatobia brumata*, L., the var. ♀; *Oporobia dilutata*, Bork., from Scotland, 2 females. Raynor obtained 2 females, July 7, from *Bupalus piniarius*, L. Bridgman, 1 male from an undetermined larva. Bignell and myself have captured females. The Scotch *Oporobia* also produced *Apanteles salebrosus*, No. 3, *ante*. Cocoons pale sulphur-yellow.

57. *Apanteles caberæ*, n. s.

Niger; ventris basi rufescente, palpis pallidis, pedibus testaceis, coxis nigris, femoribus posterioribus supra et infra plus minus nigro-lineatis, vel totis pallidis, tibiarum posticarum dimidio cum tarsis fusco, his prope basin testaceis. Alæ hyalinæ, squamulis stigmate nervis fuscis. Corpus totum læve, nitidiusculum; segmentum 1mum latitudine sesquilongius, marginatum, lateribus parallelis, apice truncatum, angulis rotundatis; 2dum longius quam *A. abjecto*, 3tio æquale, transversum, lineis 2 obliquis antrorsum convergentibus aream triangularem lævem includentibus impressum. Terebra brevissima. Valvula ventralis anum non superans. Coxæ posticæ læves. Calcaria postica metatarsi dimidio paulo longiora.

Black; palpi pale; belly at the base rufescent; legs testaceous, with black coxæ; posterior femora more or less edged with black above and beneath, or wholly pale; apical half of hind tibiæ, with their tarsi, fuscous, the latter testaceous at the base. Wings hyaline, squamulæ, stigma, and nervures fuscous. Body smooth, slightly shining; segment 1 half as long as its breadth, margined, with parallel sides, truncate at the apex, the angles rounded; 2 longer than in *A. abjectus*, as long as 3, transverse, impressed with two oblique lines converging forwards and enclosing a smooth triangular space. Terebra very short. Valvula ventralis not surpassing the anus. Hind coxæ smooth. Spurs of hind tibiæ a little longer than ½ the metatarsus. ♂ ♀. Length, 1¼; wings, 3¼ lin.

This species is very near *immunis*, Hal., but certainly distinct; the triangular space on the 2d segment is smooth, and the cocoons different.

A solitary parasite of Geometræ. Bred by Bignell, ♂ ♀, from *Cabera pusaria*, L.; ♀, from *Iodis lactearia*, L.; ♂, from *Selenia bilunaria*, Esp., and *Lomaspilis marginata*, L. The cocoons, in which they remained, in one case, from September to April, are brownish white, like those of *abjectus*.

58. *Apanteles popularis*, Hal.

Microgaster popularis, Hal., Ent. Mag., ii., 250, ♂.

Black; palpi pale, fuscous at the extreme base; sides of segment 1 narrowly, fore femora at the apex, tibiæ, and fore tarsi, testaceous; posterior tibiæ at the apex, hind tibiæ also beneath, blackish. Wings whitish hyaline, squamulæ, costa, and stigma, dark fuscous; nervures pale, the outer colourless. Mesothorax smooth, sericeous, the punctulation almost invisibly minute; scutellum, metathorax and abdomen smooth, impunctate, shining. Segment 1 scarcely longer than broad, sides somewhat rounded, and slightly converging behind the middle to the truncated apex; 2 as long as 3, with two impressed lines converging forwards and enclosing a smooth subtriangular space. Terebra very short.

Valvula ventralis not surpassing the anus. Hind coxæ smooth. Spurs of hind tibiæ shorter than ½ the metatarsus. ♂ ♀. Length, 1¼; wings, 2⅔ lin.

Smaller and less elongate than *immunis*, Hal., and further distinguished by the smoothness of the 2d abdominal segment, and colour of the wings. The 2d segment is longer than in *abjectus*; the 1st segment shorter than in *caberæ*, from which last it may also be known by the colour of the legs.

Common. Gregarious. The habitual parasite of *Euchelia jacobææ*, L., from which it has been several times reared, by Bignell, Sotheby, and myself. In July and August the parasites issue from the body of their victim, to the number of 6—9 in each brood, and make white cocoons in an irregular mass, in which they hybernate. *Mesochorus facialis*, Bridgman, is their hyperparasite.

SECTION IV.

59. *Apanteles fraternus*, Reinh.

Apanteles fraternus, Reinh., Berl. ent. Zeit., 1881, p. 47. ♂ ♀.

Black; palpi pale; femora fuscous, tibiæ fusco-testaceous, paler at the base. Wings hyaline, often sublacteous, stigma fuscous or testaceous. Mesothorax and scutellum punctulate, scarcely shining; metathorax and abdomen smooth, shining. Segment 1 twice longer than its medial breadth, with sides parallel as far as the middle, afterwards lanceolate; segment 2 with two impressed lateral lines converging forwards into deep foveæ and enclosing a triangular space. Terebra very short. ♂ ♀. Length, 1; wings, 2 lin.

Similar to the following species, but much smaller, and less elongate in form.

Bred by Bignell in some numbers from *Aspilates ochrearia*, Rossi. The minute white cocoons are arranged in an alveariform mass, the shape of which is determined by the position of the victim at the time of its death. In one case the geometrical larva is stretched almost straight upon the twig, and the cocoons form three long rows, with a few irregularly added in the middle. A similar arrangement of cocoons is described under the genus *Microgaster* (q. v.), but does not seem to occur in any other species of *Apanteles*. Brischke confirms this: he says "cocoons as in *Microgaster flavipes*." According to Reinhard, the cocoons of *A. fraternus* are sometimes more than 100 in number. Several masses of them, collected by Rogenhofer, are preserved in the zoological museum of Vienna. See Entom., xvi., 166.

60. *Apanteles triangulator*, Wesm.

Microgaster triangulator, Wesm., Nouv. Mém. Ac. Brux., 1837, p. 62, ♂ ♀.

Apanteles triangulator, Reinh., Berl. ent. Zeit., 1881, p. 47, ♂ ♀.

Black; palpi and legs testaceous; coxæ black; fore femora black at the base; middle and hind femora edged with black above and beneath, or the last entirely black; tarsi and tips of the tibiæ fuscous. Wings hyaline, stigma and nervures fuscous; the former sometimes pale. Mesothorax very minutely punctulate, scutellum smooth, both shining, as also is the metathorax. Abdomen smooth and shining; segment 1 twice as long as broad, with sides parallel nearly to the apex (which is obtusely lanceolate, or rounded), smooth, rimulose at the apex; segment 2 somewhat shorter than 3, much broader than 1, with two impressed lines curving forwards and enclosing a smooth subtriangular space. Terebra very short. ♂ ♀. Length, $1\frac{1}{4}$; wings, $3\frac{1}{2}$ lin.

I captured one ♂ near Abergavenny, and a ♀ is in the collection of Billups. Giraud records it as a parasite of *Thecla W-album*, Knoch. Brischke bred it from *Stauropus fagi*, L., and from *Pseudoterpna pruinata*, Hufn.; he says the cocoons are yellowish, woolly, single or gregarious. Wesmael reared six males and two females from a bundle of pale yellow cocoons attached to a blade of grass near Boisfort, Belgium, in the middle of June. W. H. B. Fletcher bred a ♂ from *Psychoides Verhuellellus*, Heyd. Billups a ♀ from *Boarmia gemmaria*, Brahm, April 1st; its cocoon is white, without any perceptible tinge of yellow.

61. *Apanteles pallidipes*, Reinh.

Apanteles pallipes, Reinh., Berl. ent. Zeit., 1881, p. 48, ♂ ♀.

Black; antennæ at the base, belly at the base, palpi, and legs, pale testaceous; hind coxæ usually black at the base. Wings hyaline, stigma testaceous or fusco-testaceous. Mesothorax somewhat shining, very finely punctulate; metathorax rugulose, dull, with a medial carina. Segment 1 twice as long as its medial breadth, narrowed towards the apex, forming an elongate triangle, rugulose; segment 2 a little shorter than 3, transverse, with two impressed lines converging forwards, and enclosing a triangular space; the other segments smooth. Terebra very short. ♂ ♀. Length, 1⅓; wings, 3⅓ lin.

This species looks very like *fulvipes*, Hal., from which it may be known by the form of the 1st segment, and by the rugose metathorax, bisected by a longitudinal carina. In *fulvipes* the 1st segment is more than three times as long as its medial breadth, and the metathorax smooth, or nearly so, without a longitudinal carina. Some specimens of *pallidipes* have the legs slightly varied with fuscous.

Abundant; attacking almost exclusively the larvæ of the genus *Plusia*; though, if there be no mistake, Brischke at Danzig has also obtained it from *Spilodes verticalis*, L., *Cucullia argentea*, Hufn., and *Vanessa urticæ*, L.

Bignell has bred series from *Plusia gamma*, L.; one of these broods remained 32 days in pupa, hatching out Oct. 16th; another set, bred by W. H. B. Fletcher, came forth August 9th; another, bred by J. E. Fletcher, on September 30th; Rogenhofer at Vienna, according to Reinhard, has reared it from the same. Also obtained by Bignell from *Plusia iota*, L., and *P. chrysitis*, L. Numerous examples are in Fitch's collection, bred by him from *Plusia gamma*, and by Meldola from *P. iota*, L. Goureau bred 24, on August 23rd, from the white agglomerated cocoons surrounding a larva of *Plusia festucæ*, L., collected on August 9th (Ann. Soc. Fr. (2), iii., 361; 1845). Cocoons white, enclosed by the gregarious maggots in an oval ball of flocculent texture, as large as a pigeon's egg; resembling the nest of *congestus*, N., except that the latter is smaller and yellow.

62. *Apanteles bicolor*, Nees.

Microgaster bicolor, Nees, Mon., i., 181, ♀; Ratz., Ichn. d. Forst., ii., 50, ♂ ♀.

Apanteles bicolor, Reinh., Berl. ent. Zeit., 1881, p. 48, ♂ ♀.

Microgaster circumscriptus, Nees, Mon., i., 181, ♀.

M. exiguus, Hal., Ent. Mag., ii., 249, ♀.

M. ardeæpennellæ, Bouché, Naturg. (1834), 153, ♀.

M. lividipes, Wesm., Nouv. Mém. Ac. Brux., 1837, p. 63, ♂ ♀.

Black; palpi pale; belly testaceous at the base; abdomen above often rufo-testaceous at the base or in the middle; legs testaceous;

hind coxæ, with their femora, often more or less infuscated. Wings hyaline, stigma testaceous. Mesothorax thickly punctulate, dull; metathorax more shining, punctulate. Abdomen ♀ compressed. Segment 1 more than twice as long as its medial breadth, slightly rugulose, with sides parallel as far as the middle, from thence to the apex converging, lanceolate; segment 2 nearly smooth, with 2 impressed lines converging towards the base, and enclosing a triangular space; the rest smooth and shining. Terebra as long as ¼ of the abdomen, subdecurved; valves subclavate, pilose. ♂ ♀. Length 1⅓; wings 2¾ lin.

The colour of the abdomen and legs varies, even in the same brood; but the species is easily known by its structure. The antennæ are testaceous at the extreme base; those of the ♂ are also frequently dull rufous beneath.

An abundant parasite, living in small families, or solitary, according to the size of the larva attacked. Not common in *Geometræ*, but once bred by Bignell (four males, five females) from *Gnophos obscuraria*, Hüb. Usually infesting singly the leaf-mining *Tineæ*. Reared twice by Elisha from *Lithocolletis lantanella*, Schr., March 14th; from *Gracilaria tringipennella*, Zell., May 31st; *semifascia*, Haw., July 17th; *Psychoides Verhuellellus*, Heyd., *Catoptria æmulana*, Schl., Sept. 4th; and *Nannodia Hermannella*, Fab., June 9th. By Parfitt and Fletcher from *Lithocolletis vacciniella*, Scott. By W. H. B. Fletcher from *Elachista tæniatella*, Staint., May 9th. On the Continent, by Reissig and Ratzeburg, from *L. cavella*, Zell., *pomifoliella*, Zell., *emberizipennella*, Bouché, *Tischeria complanella*, Hüb., &c. By Brischke from *Plutella porrectella*, L., *Lithocolletis lantanella*, Schr., and *L. spinicolella*, Kol. Ratzeburg remarks that the parasitic maggot works its way through the dry epidermis of the leaf inhabited by the *Tinea*, and attaches its cocoon by a few threads to the under side. Bouché's "ardeæpenella" was from *Gracilaria syringella*, Fab., = *ardeipennella*, Tr. Captured frequently in England, by Dorville, Bignell, Bridgman, Haliday, &c. Cocoons white, according to Bouché; greyish brown, according to Ratzeburg; pale yellow, according to Parfitt; silky-white and single, according to Brischke. Those which I received from Bignell were of the usual silvery white.

63. *Apanteles formosus*, Wesm.

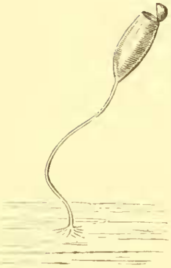
Microgaster formosus, Wesm., Nouv. Mém. Ac. Brux., 1837, p. 60, pl., f. I. (♀?).

Apanteles formosus, Reinh., Berl. ent. Zeit., 1881, p. 50, ♂ ♀.

Black; mouth, palpi, squamulæ, 1st abdominal segment, belly at the base, and legs, flavo-testaceus; hind coxæ at the base, or wholly, black; hind femora and tibiæ darker at the tips, their tarsi also infuscated. Wings hyaline, stigma fuscous. Thorax very smooth and shining; metathorax with the apex produced, and a wide shallow depression on each side, giving it somewhat the form of a saddle. Segment 1 smooth and shining, more than twice as long as its breadth, the sides parallel nearly as far as the rounded apex, where it is somewhat rugulose; 2 shorter than 3, transverse, with two oblique basal impressions, smooth and shining, like the remaining segments. Terebra short. Valvula ventralis surpassing the anus. Internal spur of the middle tibiæ slightly curved at the apex. ♂ ♀. Length $1\frac{5}{6}$; wings $4\frac{2}{3}$ lin.

A species remarkable for structure, colour, and the doubt connected with its earlier state. In addition to the form of the metathorax above described, the 2d abdominal segment is peculiar. The two oblique basal impressions fail before reaching the posterior margin, and consequently do not enclose a triangular space; and the middle of the anterior margin is angularly produced. The 1st segment differs from that of *A. fulvipes*, Hal., and its allies, in being broader, shorter, and not attenuated hindwards till just before the apex. The abdomen of the ♂ is smaller and narrower than that of the ♀, and the 1st segment infuscated towards the apex. The unknown *Ichneumon intercus*, Schr. (Enum. ins. Austr., 764), as to its description, agrees very closely with the ♀ of this insect.

Wesmael's original specimen, of doubtful sex, was taken near Liège. According to Reinhard, both sexes have since been reared at Vienna from *Orgyia antiqua*, L., making pure white cocoons. Bignell, in England, bred a ♀, June 20th, 1881, from a half-grown larva of *Tæniocampa stabilis*, View., which is preserved with it, together with a white cocoon of the usual appearance. But he has also reared the ♂ from *Uropteryx sambucaria*, L., and in this case the cocoon is totally different, being yellowish brown, of a shining gummy texture, and raised upon a long stiff footstalk of the same material. This is



entirely unlike anything constructed by a Braconid (see fig.), and rather resembles the pedicellate egg of a *Chrysopa*. The cocoons of *Perilitus* cannot be compared, for they are suspended by a thread, not elevated upon a rigid peduncle. Bignell obtained several of these cocoons from *Uropteryx* in the same manner, although I have only three of his now before me. His observation is singularly confirmed by the fact that among insects kindly communicated by Parfitt for examination, I find a ♂ of *A. formosus*, accompanied by a similar pedunculated cocoon. This specimen is an old one from Dorville's collection. The Microgasterides do not avail themselves of pupa-cases made by other insects, but manufacture their own; nor is it likely that the ♂ of any species constructs a cocoon totally different in material and design from that of the ♀. Some further observations alone can explain this difficulty.

64. *Apanteles lautellus*, n. s.

Niger, palpis, pedibus, abdomine, flavo-testaceis; hoc apice nigro, interdum supra et apice, vel fere totum nigrum. Coxæ posticæ basi plus minus nigræ, vel totæ testaceæ; tibiæ posticæ apice infuscatæ. Alæ hyalinæ, squamulis, stigmate, nervis, pallide piceis vel testaceis. Mesothorax et scutellum lævia nitidula; metathorax lævis. Segmentum 1mum læve, a basi ad apicem sensim angustatum, lanceolatum, apice rotundato, latitudine media plusquam duplo longius, rufum vel nigrum; 2dum transversum, 3tio brevius, 1mo latius, lineis duabus obliquis antrorsum convergentibus spatium triangulare includentibus impressum, cum cæteris læve. Terebra abdominis partem quintam æquans, valvulis crassiusculis subdecurvis. Valvula ventralis ampla, anum paulo excedens.

Black; palpi, legs, and abdomen flavo-testaceous; the last black at the apex, sometimes above, or almost wholly black. Hind coxæ more or less black at the base, or entirely testaceous; hind tibiæ infuscated at the apex. Wings hyaline, squamulæ, stigma, and nervures pale piceous or testaceous. Mesothorax and scutellum smooth, somewhat shining; metathorax smooth. Segment 1 smooth, gradually narrowed from the base to the apex, lanceolate, the apex rounded, more than twice as long as its medial breadth, rufous or black; 2 transverse, shorter than 3, broader than 1, with two impressed oblique lines converging forwards and enclosing a triangular space, smooth like the remaining segments. Terebra ⅓ of the abdomen, valves somewhat incrassated, subdecurved. Valvula ventralis large, a little surpassing the anus. ♀. Length, 1; wings, 2¼ lin.

Described from ten females. The form of the 1st segment refers this species to the IVth Section, and distinguishes it from the few others that are abnormally coloured. Typical specimens have segments 1—4 testaceous, the 1st rather more rufous, and the rest black; the coxæ are entirely pale. In two or three examples the abdomen is dark above, and the hind or even the middle coxæ fuscous at the base. But several are so placed on a card as to prevent their examination.

Bred April 27th by Elisha from *Lithocolletis lautella*, Zell. (five specimens); from *L. lantanella*, Schr. (five specimens); July 17th, from *Gracilaria semifascia*, Haw. (three specimens); and one dark coloured and in bad condition, but apparently of this species, from *Lithocolletis carella*, Zell.

65. *Apanteles umbellatarum*, Hal.

Microgaster umbellatarum, Hal., Ent. Mag., ii., 247, ♀.

Black; palpi, sides of the abdomen, legs, squamulæ, stigma, and nervures, pale yellowish; 4 posterior femora with a line above and beneath, and tips of the hind tarsi, fuscous; coxæ also fuscous, the hind pair pale at the apex. Wings hyaline. Mesothorax smooth, sericeous, iridescent; metathorax and abdomen smooth, shining; the latter compressed in the ♀. Segment 1 twice as long as broad, with sides parallel as far as the middle, afterwards narrowed to the rounded apex; 2 much broader than 1, with two strongly impressed lines converging forwards and enclosing a subtriangular space. Terebra ½ abdomen, decurved; valves clavate. Valvula ventralis large, triangular, but not surpassing the anus. ♀. Length, ¾; wings, 1½ lin.

This species, one of the smallest of the genus, is intermediate between Sections II. and III.; the exserted terebra refers it to the former, and the abdominal structure to the latter. It most resembles *bicolor*, Nees.

Taken by Haliday in autumn on the flowers of *Angelica sylvestris*. Two females, bred by W. H. B. Fletcher, of Worthing, from *Lithocolletis spinicolella*, Kol., are the only specimens I have seen.

66. *Apanteles callidus*, Hal.

Microgaster callidus, Hal., Ent. Mag., ii., 248, ♀.
Apanteles callidus, Reinh., Berl. ent. Zeit., 1881, p. 49, ♂ ♀.
Microgaster majalis, Wesm., Nouv. Mém. Ac. Brux., 1837, p. 64, ♂ ♀.

Black; palpi, squamulæ, belly at the base, segments 1—3 at the sides, sometimes 3 entirely, and legs, testaceous; hind coxæ wholly or at the base, hind tibiæ at the apex, with their tarsi, fuscous. Wings dull hyaline; stigma fuscous, often pale. Mesothorax very finely punctulate, rather shining; metathorax punctulate, smoother in the middle. Abdomen compressed beneath; segment 1 slender, more than three times longer than its medial breadth, narrowed from the base to the apex, rugulose; 2 with two impressed lines converging forwards and enclosing a triangular rugulose space; the rest smooth. Hind coxæ large, granulated. Inner spur of the middle tibiæ slightly curved. Terebra very short. Valvula ventralis not surpassing the anus. ♂ ♀. Length, 1¾; wings, 3½ lin.

Var. Hind femora and tibiæ fuscous at the apex, or the former with a fuscous line above.

The distinctive character lies in the punctulate, or granulated, and incrassated hind coxæ; in *lateralis*, Hal., they are smoother; moreover the ♀ of *lateralis* has a longer terebra. *A. vitripennis*, Hal., is larger, and the hind coxæ are smooth. The wings of *callidus* are very narrow.

Not very common. Reared by Bignell, in small broods of 3—6, from *Nemeophila plantaginis*, L., *Abraxas grossulariata*, L., and *Triphæna orbona*, Hufn. Captured near Norwich by Bridgman. Cocoons white.

67. *Apanteles lateralis*, Hal.

Microgaster lateralis, Hal., Ent. Mag., ii., 248, ♂ ♀.
Apanteles lateralis, Reinh., Berl. ent. Zeit., 1881, p. 49, ♂ ♀.
? *Microgaster rufilabris*, Ratz., Ichn. d. Forst., i., 69, ♀.

Black; palpi, squamulæ, margins of segments 1—2, belly at the base, and legs, testaceous; hind coxæ black (sometimes pale at the apex), hind femora broadly, and tibiæ, fuscous at the apex. Wings hyaline, stigma fuscous. Mesothorax very finely punctulate, rather shining; metathorax with a few punctures, nearly smooth. Abdomen compressed beneath; segment 1 slender, three times longer than its medial breadth, narrowed posteriorly, shining, almost smooth; 2 with the usual impressed lines converging forwards; the rest smooth and shining. Terebra as long as $\frac{1}{2}$ the abdomen, or a little less. Hind coxæ punctulate, shining. Valvula ventralis surpassing the anus. Inner spur of the middle tibiæ slightly curved. ♂ ♀. Length, $1\frac{1}{5}$—$1\frac{1}{2}$; wings, $2\frac{4}{5}$—3 lin.

Var. 1, ♂. Hind femora mostly black; middle tibiæ fuscous at the apex.

Var. 2, ♀. Stigma pale testaceous. Bred by W. H. B. Fletcher from *Elachista tæniatella*, Staint.

This species closely resembles *vitripennis*, Hal., and the males are hard to distinguish, except by the smoother metathorax and larger size of the latter. Reinhard, in his 'Bestimmungs-Tabelle,' distinguishes the two species by the females only.

Common. Bred by Dorville from *Eupithecia assimilata*, Guenée; a ♀, Sept. 15th, by Bignell from *Symæthis oxyacanthella*, L. If the synonym from Ratzeburg be correct, it is also a parasite of *Hyponomeuta padellus*, L., bred by Kirchner. It is abundant in a wood close to my house, at Nunton, Salisbury, and is taken at Maldon by Fitch. Cocoons white.

68. *Apanteles vitripennis* (Cur.), Hal.

Microgaster vitripennis, Cur., B. E., 321; Hal., Ent. Mag., ii., 248, ♂ ♀.

Apanteles vitripennis, Reinh., Berl. ent. Zeit., 1881, p. 50, ♂ ♀.

Microgaster fulcriger, Wesm., Nouv. Mém. Ac. Brux., 1837, p. 65, ♂ ♀.

M. flavilabris, Ratz., Ichn. d. Forst., i., 69, pl. ii., f. 19, ♀.

Black; palpi, squamulæ, margins of segments 1—2, belly at the base, and legs, testaceous; hind coxæ at the base, or beneath, or wholly, black; hind tibiæ, and often hind femora, tipped with black; hind tarsi fuscous, the joints pale at the base. Segments 2—3 ♀ sometimes testaceous above, with a black patch common to both, not connected with the rest of the black surface. Wings hyaline, stigma fuscous. Mesothorax very finely punctulate, sericeous, shining; metathorax smooth, especially in the middle. Abdomen smooth and shining; segment 1 nearly three times as long as its medial breadth, attenuated from the base to the subrugulose apex, lanceolate; 2 with the usual impressed lines converging forwards, and a central ridge, continued from the 1st segment, somewhat rugulose. Terebra very short. Hind coxæ shining, punctulate. Valvula ventralis surpassing the anus. Inner spur of the middle tibiæ slightly curved at the apex. ♂ ♀. Length, $1\frac{3}{4}$; wings, $4\frac{1}{4}$ lin.

The abdomen, as in *lateralis*, Hal., is short, narrow, and compressed, giving to the ♂ somewhat the aspect, as Haliday remarks, of *Evania*.

Not common. I have a ♂ taken at Abergavenny, and a ♀ from Leicestershire. Raynor has bred the ♂ at Brandon, May 16th, from *Thera variata*, Schiff.; the cocoon is accidentally stained at one end orange-red. Four males and a female were also reared by Sotheby, May 7th, from cocoons found sticking to heather; and a ♀ by Billups from *Boarmia gemmaria*, Brahm. Bignell obtained a ♂ on April 14th from a larva of *B. repandata*, L., not half-grown; it remained in the pupa-state about 20 days. According to Reinhard both sexes have been bred on the Continent from *Spilosoma fuliginosa*, L., and Brischke records it from *Lasiocampa pini*, L., but he probably refers to the next species. Cocoons white.

69. *Apanteles fulvipes*, Hal.

Microgaster fulvipes, Hal., Ent. Mag., ii., 249, ♂ ♀.

Apanteles fulvipes, Reinh., Berl. ent. Zeit., 1881, p. 51, ♂ ♀.

Microgaster glomeratus, Nees, Mon., i., 179 (excl. syn.); Wesm., Nouv. Mém. Ac. Brux., 1837, p. 65, pl., figs. 6, K (wing and base of abdomen), ♂ ♀.

M. nemorum, Hartig, Jahresb., 252; Ratz., Ichn. d. Forst., i., 69, ♂ ♀; pl. vii., f. 14, ♀.

Black; palpi, mandibles at the apex, squamulæ, and legs, flavo-testaceous; base of the belly pitchy-rufous; hind coxæ black, sometimes pale at the apex. Wings hyaline, stigma fusco-testaceous. Thorax very finely punctulate, moderately shining. Segment 1 very finely aciculated, nearly four times as long as its medial breadth, gradually narrowed from the base to the apex, lanceolate; 2 with the usual converging impressions enclosing a triangular aciculated space; the rest smooth and shining. Terebra very short. Hind coxæ shining, punctulate. Valvula ventralis not surpassing the anus. Inner spur of the middle tibiæ straight; spurs of hind tibiæ shorter than $\frac{1}{2}$ the metatarsus. ♂ ♀. Length, $1\frac{1}{4}$; wings, $3\frac{1}{2}$ lin.

Smaller than *vitripennis*, Hal., with narrower wings and paler stigma; the abdomen is less compressed, the triangular space on the 2d segment aciculated ; the spurs of the middle tibiæ straight, and the legs uniformly testaceous, except that the hind tibiæ of the ♂ at the apex, and their tarsi, are sometimes darker.

Very abundant from about the vernal equinox, appearing earlier than the other species. It seems to be omnivorous, having been bred by Bignell in great numbers from *Vanessa Atalanta*, L., *Porthesia similis*, Fues., *Diloba cæruleocephala*, L., *Noctua xanthographa*, Fab., *Triphæna orbona*, Hufn., and *fimbria*, L., *Amphipyra pyramidea*, L., *Miselia oxyacanthæ*, L., *Xylocampa areola*, Esp., *Xylina ornithopus*, Rott., *Asteroscopus sphinx*, Hufn., *Catocala nupta*, L., *Selenia bilunaria*, Esp., *Himera pennaria*, L., and *Larentia viridaria*, Fab. The broods from *Miselia* considerably outnumber the others. From *Diloba* only two parasites were excluded ; from *Miselia* as many as 38 ; the average number is about 20. The period of pupation lasts about a fortnight. In certain cases they are carried under ground by the retreating caterpillar, and, when hatched, force their way upwards through the soil. Ratzeburg* says that in Germany they are the constant enemies of *Lasiocampa pini*, L., little less numerous than his *ordinarius.* The following additional names of victims are from Brischke :—*Ocneria dispar*, L., *Pygæra pigra*, Hufn., *Acronycta tridens*, Schiff., *Melanippe galiata*, Hüb., and *Chesias spartiata*, Fues. Cocoons white.

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* The abundance of this species caused it to be employed by Ratzeburg as the subject of his experiments and observations. See Ichn. d. Forst., i., 62, for description and life-history of the larva and pupa: pl. vii., ff. 23, 24 represent a *Lasiocampa* larva opened, showing the position and appearance of the parasites in the inside, natural size ; f. 25, another larva, with the same parasites recently emerged, and preparing to spin their cocoons, &c. Ratzeburg's great work on the parasites of insects affecting the cultivation of woods and forests, being written in German, is less extensively known in this country than it deserves to be. The following epitomized extract will show the interesting nature of his enquiries, so far as concerns *A. fulvipes* :—" The full-grown larva, at the time when it proceeds to spin its cocoon (on the outside of the dead caterpillar that has served for its victim), is 2—3 lines long, greenish white, with a green intestinal canal. The trophi are in a more rudimentary state than in other Ichneumon-larvæ that have been observed. The labial palpi consist of a single joint ; the maxillæ are represented by two white processes ; and the future mandibles are indicated by the thickened ends of a brownish curved streak, of a horny consistence. Of the clypeus and antennæ no rudiments appear. Of the 12 segments which compose the body, 1—3 are denoted by the absence of the lateral swellings which distinguish 4—10, each of which bears a spiracle. Each segment is furnished with a transverse row of minute black tubercles. The pupa (pl. vii., f. 31) is 2 lines long, showing all the organs of the perfect insect, packed into the smallest space ; the antennæ lie

iv. MICROPLITIS, *Först.*

Först., Verh. pr. Rheinl., 1862, p. 245 ; Reinh., Berl. ent. Zeit., 1880, p. 358.

Maxillary palpi 5-, labial 3-jointed. Eyes villose. Antennæ 18-jointed. Mesopleuræ impressed with a crenate fovea. Abdomen sessile ; suturiform articulation obsolete. Radius of the fore wing

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along the belly between the legs ; the colour is yellowish white, and no pubescence appears.—The larva of a *Microgaster* differs from that of most insects in undergoing several considerable changes of form in the course of its growth, presenting three principal stages. (1) At first, while less than 1 line in length, it is a slender vermiform creature, of 12 segments, without a distinct head, and destitute of the singular caudal vesicle which subsequently appears. (2) When about 1½ lines long it is proportionally much thicker, and the head becomes well defined. At this time the spinning-organ may be discerned, consisting of a linear duct which commences at the head, and lies parallel to the alimentary canal as far as the middle, where it bifurcates, and is continued in two branches to the anal segment. The caudal vesicle just mentioned is a round bladder-like body attached to the last segment, and covered by a fine skin which the microscope shows to be studded with points or tubercles. It appears only during the middle life of the larva, becoming absorbed, like the tail of a young batrachian, before the attainment of full growth, and as soon as the tracheæ are developed. Hence it has been supposed to be an organ of respiration ; but this seems to leave unexplained the earlier mode in which that function is performed. (3) The third stage differs from the two preceding in the exhibition of tracheæ, and the suppression of the caudal vesicle. The mouth now consists of a porrected haustellum, situated in the middle of four tubercular processes, the analogues of the future palpi."—The parasite derives its nutriment by sucking the adipose tissue of the victim. The latter, without being lacerated, is thus subjected to continual exhaustion and irritation, producing marasmus, which is at last precipitated into death by the breaking up of the tracheal system caused by the numerous perforations of the skin through which the parasites effect their egress.—The presence of a ravenous brood of Microgasters in the body of a larva of *L. pini* does not prevent the same larva from being struck by other Ichneumons. Ratzeburg has detected the maggot of an *Anomalon*, distinguished by its larger size, in the midst of these parasites : the fact is delineated in vol. iii., pl. 9, ff. 23, 24. As the *Anomalon* takes a much longer time to attain its full size than the Microgasters, it is probable that the deposition of the egg of the former took place before those of the latter ; unless we suppose the *Anomalon* to perish prematurely by the exhaustion of its supply of nutriment.

almost complete; three cubital areolets, the 2d triangular, minute. Hind coxæ and spurs of hind tibiæ short, the latter not half the length of the metatarsus. Terebra very short, or concealed.

The 1st abdominal segment is furnished at the apex with a shining tubercle. The 2d segment is smooth and shining, only in two species dull and coriaceous. The cocoons are different from those of *Apanteles* and *Microgaster*. They are pergamentaceous or papyraceous, somewhat glossy, naked, grey, brown, yellow, and, in two instances, pea-green, but never pure white. They are either wrinkled, or strongly ribbed or fluted longitudinally, like the seeds of *Artemisia*, and found singly or in small clusters.

This genus and the following are comprised in Ruthe's posthumous paper on *Microgaster*, published by Reinhard in Berl. ent. Zeit., 1860, pp. 105—160. The descriptions are among the very best that are to be found in hymenopterous literature. The section of *Microgaster* characterised by Ruthe (*lib. cit.*, p. 125), containing sixteen species, received from Förster the name *Microplitis*. Reinhard (*lib. cit.*, pp. 358—360) has given a summary of Ruthe's work, with rectifications and a synoptical table, upon which the following is founded.

The species generally attack Lepidoptera, but Brischke states that he has bred *M. fumipennis*, Ratz., from two saw-flies, *Schizocera geminata*, L., and a *Macrophya*; while Ratzeburg reports the same parasite from *Emphytus succinctus*, Kl.

Table of Species.

(14) 1. First abdominal segment never more than 1½ times as long as its breadth, mostly shorter, not attenuated towards the apex, which is broadly rounded.
(5) 2. Segment 2 dull, coriaceous.
(4) 3. Hind tarsi blackish or fuscous .. 1. *Spinolæ*, Nees.
(3) 4. Hind tarsi testaceous .. .. .. 2. *xanthopus*, Ruthe.
(2) 5. Segment 2 shining, smooth.
(7) 6. Segment 1 smooth and shining .. 3. *ocellatæ*, Bouché.
(6) 7. Segment 1 punctato-rugulose.
(9) 8. Stigma unicolorous, or only a little paler at the base .. .. .. 4. *vidua*, Ruthe.
(8) 9. Stigma bicolorous, determinately pale at the base.
(13) 10. Wings deeply infumated.
(12) 11. Tibiæ obscure rufous; antennæ ♀ as long as ¾ of the body .. .. 5. *tristis*, Nees.
(11) 12. Tibiæ rufo-testaceous; antennæ ♀ longer than ¾ of the body .. .. 6. *dolens*, n. s.

(10) 13. Wings slightly infumated .. .. 7. *spectabilis*, Hal.
(1) 14. First abdominal segment narrow, about twice as long as broad, attenuated towards the apex.
(16) 15. Antennæ more or less testaceous .. 8. *mediator*, Hal.
(15) 16. Antennæ black.
(20) 17. Hind femora rufous; scutellum thickly punctulate and dull.
(19) 18. Segment 2 testaceous at the sides; stigma broadly pale at the base; cocoons greenish white, almost smooth .. .. 9. *mediana*, Ruthe.
(18) 19. Segment 2 wholly black; stigma unicolorous, or with only a small pale basal dot; cocoons ash-coloured, strongly ribbed .. .. .. 10. *tuberculifera*, Wesm.
(17) 20. Hind femora mostly black; scutellum more or less shining.
(22) 21. Metathorax punctato-rugose .. .. 11. *adunca*, Ruthe.
(21) 22. Metathorax reticulato-rugose .. 12. *borealis*, n. s.

1. *Microplitis Spinolæ*, Nees.

Microgaster Spinolæ, Nees, Mon., i., 166; Wesm., Nouv. Mém. Ac. Brux., 1837, p. 41, pl. (wing); Ruthe, Berl. ent. Zeit., 1860, p. 145, ♂ ♀ (not of Hal.).

Black; palpi pale; belly of the ♀ broadly pale at the base; legs rufo-testaceous; coxæ, upper trochanters at the base, hind femora at the extreme tips, and hind tarsi, nigro-fuscous, the last sometimes paler. Scape of the antennæ rufescent (black in the English specimens). Face covered with white pubescence. Wings infumated, squamulæ, stigma, and nervures dark fuscous, the stigma determinately yellow at the inner angle. Head more shining than the mesothorax and scutellum, which are ruguloso-punctulate and dull. Metathorax rugulose, subreticulated, carinated. Segment 1 rugulose, 1½ times as long as its apical breadth, slightly and gradually narrowed towards the base, the apical half convex and subcarinated; segment 2 uneven, more or less aciculated at the base, and with 2 indistinct arcuate impressions before the apex. Terebra concealed. ♂ ♀. Length, 1¾—2; wings, 4¼ lin.

Var. ♂ ♀. Middle femora at the base, and hind femora entirely, black.

The ♀ is more slender than *xanthopus*, Ruthe, and distinguished from that species by the dark colour of the hind tarsi. Segment 1 is rather shining, flat on the basal half, and posteriorly gibbous, with or without a faint medial carina. Segment 2 is not always aciculated at the base, nor are the arcuate impressed lines before the apex uniformly distinct. Segment 3 sometimes exhibits a transverse subtestaceous band. The sutures of the mesothorax are indistinctly visible. The ♂ differs in having the belly black at the base.

The ♂ was bred by Nees v. Esenbeck in July, 1809, from a cocoon found on an oak-twig, and from *H. oleracea*, L. It formed a green pearly cocoon, and remained in the pupa-state a fortnight. He also states that he captured several more of both sexes between June and August at Sickershausen. Brischke bred the species from *Miselia oxyacanthæ*, L., and *Plusia gamma*, L.; he describes the cocoon as being of a bright bluish green. According to Giraud, Rogenhofer reared it from *Habrostola tripartita*, Hufn. W. H. B. Fletcher, of Worthing, bred a pair, belonging to the var., from *Lyperina cespitis*, Fab. Wesmael procured four males and one female in Belgium, but, as he says the hind tarsi are sometimes testaceous, some of these may have been *xanthopus*. The ♀ has been twice taken at Maldon by Fitch, in August; and by Billups at Margate. I captured a ♂ near Barnstaple, another in Darenth Wood, a third at Cheltenham, a fourth at St. Albans, and a fifth in an osier-bed at Nunton, Salisbury, Sept. 3rd. The remarkable grass-green cocoons are made by two different species of this genus; those of *sordipes*, Nees, are described as similar (though not so by Brischke), and the species may probably be found in England, though I have seen no specimens.

2. *Microplitis xanthopus*, Ruthe. (Pl. V., fig. 7).

Microgaster xanthopus, Ruthe, Berl. ent. Zeit., 1860, p. 147, ♀.

Black; palpi and legs rufo-testaceous, including the hind tarsi; coxæ, upper trochanters, and claws, black. Wings infumated, with a testaceous tinge, squamulæ piceous, nervures and stigma fuscous, the last determinately yellow at the inner angle. Head, mesothorax, and scutellum ruguloso-punctate and dull. Metathorax coarsely intricato-rugose, carinated. Segment 1 rugulose, not much longer than its apical breadth, considerably narrowed towards the base, where is a large oblong fovea. Segment 2 vaguely and indistinctly rugulose, without any arcuate impressions. Terebra very short. Valvula ventralis large, acuminated. ♀. Length, 2; wings, 4 lin.

Very nearly allied to the preceding, but doubtless distinct. Antennæ entirely black, scarcely shorter than the body. Face with scanty whitish pubescence. The 1st segment is not flat on the basal half, but longitudinally excavated, not remarkably gibbous posteriorly, and not carinated. The belly at the base is concolorous, or nearly so. The valvula ventralis is more conspicuous than in other species, reaching or even exceeding the anus. The terebra of the British specimen is subexserted, but not so long as in the four German females described by Ruthe, *viz.*, one-fifth or one-fourth of the abdomen.

A single specimen is in Bridgman's collection.

3. *Microplitis ocellatæ*, Bouché.

Microgaster ocellatæ, Bouché, Naturg. (1834), 161; Ratz., Ichn. d. Forst., ii., 48; iii., 48; Ruthe, Berl. ent. Zeit., 1860, p. 132, ♂ ♀.

M. canaliculatus, Wesm., Nouv. Mém. Ac. Brux., 1837, p. 41, ♀.

M. ingratus, Hal., Ent. Mag., ii., 236, ♀; *cf.* Reinh., Berl. ent. Zeit., 1880, p. 359.

Black; palpi pale at the apex; antennæ beneath reddish fuscous; sides of segment 1 narrowly, and legs, testaceous; coxæ black; sometimes the base of the femora, the hind tarsi, and the last joint of the 4 anterior tarsi, blackish. Wings slightly infumated, with an obsolete darker stain beneath the fuscous stigma; squamulæ testaceous; nervures fuscescent. Antennæ ♂ ♀ longer than the short, compact body. Head and mesothorax dull, granulated, the hind margin of the latter, and the punctulate scutellum, more shining. Metathorax short, rugulose, subreticulated. Abdomen smooth and very shining; segment 1 subquadrate, rounded posteriorly, anteriorly depressed and excavated. Terebra concealed. Valvula ventralis subtruncate. ♂ ♀. Length, 1½—2; wings, 3⅓—4⅓ lin.

Mandibles rufous, fuscous on the outer edge. Clypeus shining, the rest of the face dull. Mesothoracic sutures obsoletely indicated. Metathorax with an indistinct carina sometimes bifurcated hindwards. Abdomen oval, shorter than in the other species, everywhere smooth and shining. Stigma often with a pale dot at the inner angle. Legs short.

Described from 44 specimens, ♂ ♀. A common parasite of the hawk-moths, *Smerinthus ocellatus*, L., and *S. populi*, L. Has been bred on the Continent by Bouché, Ratzeburg, Reissig, Dahlbom, Giraud, and

Brischke; and in England by Bridgman, Bignell, Brown, Wilson, Fitch, and myself. The broods, consisting of a dozen individuals, or less, are excluded in the middle of September, and remain as pupæ till the following May or June. Cocoons greyish brown, rough, longitudinally and irregularly wrinkled, naked, strong, and closely agglutinated together. From one of Brischke's cocoons appeared the hyperparasite *Mesochorus splendidulus*, Gr. Ratzeburg reports that in Germany Bachmann obtained a ♀ on Sept. 22nd from *Acronycta psi*, L., which became an imago on the 14th of April following; but the observation is given doubtfully.

4. *Microplitis vidua*, Ruthe.

Microgaster viduus, var., Ruthe, Berl. ent. Zeit., 1860, p. 134, ♂ ♀.

Black; palpi more or less pale; sides of segment 1 narrowly, and legs, testaceous; coxæ and upper trochanters, fore femora at the base, the others wholly or partially, black; hind tarsi infuscated. Wings infumated, squamulæ black, stigma and nervures fuscous. Antennæ ♀ a little longer than the body. Head, mesothorax, and scutellum dull, finely granulated. Metathorax rugulose, subreticulated, subcarinated. Abdomen smooth and shining, except the 1st segment, which is rugulose, about 1½ times longer than broad, with parallel sides almost to the apex, and then broadly rounded. Terebra subexserted, and, with the valvula ventralis, much shorter than the anus. ♂ ♀. Length, 1⅔; wings, 4 lin.

The typical form, which I have not seen, differs, according to Ruthe, in being short and compact, for he compares it with the larger examples of *ocellatæ*, Bouché. The metathorax is less coarsely rugulose, the 1st segment a little broader, and its sculpture almost obsolete. The var. is intermediate between this form and *tuberculifera*, Wesm., from which it is distinguished by the broader 1st segment, not attenuated towards the apex; the posterior femora are black, the stigma unicolorous, and the cocoons different.

There are three British specimens at hand; one ♂ taken by me in Leicestershire, and a ♀ bred by Bignell from *Tæniocampa incerta*, Hufn.; a ♂ April 28th from an unknown victim by Billups. Brischke bred it from *Smerinthus populi*, L. The cocoon is more or less brownish grey, and most resembles that of *M. tuberculifera*, Wesm., but is larger and more irregularly wrinkled.

5. *Microplitis tristis*, Nees.

Microgaster tristis, Nees, Mon., i., 168, ♂ ♀, where "abdomine toto rufo" is an evident misprint for "toto nigro" (not the vars.); Wesm., Nouv. Mém. Ac. Brux., 1837, p. 39 (not the var.); Ruthe, Berl. ent. Zeit., 1860, p. 138, ♂ ♀.

Deep black; palpi fuscous; tibiæ, fore femora at the apex, and anterior tarsi at the base, obscurely rufous; posterior tibiæ often black, except the base and apex. Wings fuscous, with an obsolete pale streak across the middle; squamulæ black, nervures and stigma fuscous, the latter determinately yellow at the inner angle. Antennæ ♀ $\frac{3}{4}$ the length of the body, filiform; those of the ♂ rather longer than the body, setaceous. Head and mesothorax punctulate, the latter rather shining, especially towards the hind margin; scutellum smooth and shining. Metathorax rugulose, subreticulated, carinulated. Abdomen smooth and shining, only the 1st segment with a few minute exarations or scratches, a little longer than its mean breadth, with a shallow basal impression, and slightly widened from the base to the apex, which is broadly rounded. Terebra very short. ♂ ♀. Length, $1\frac{1}{2}$—$1\frac{3}{4}$; wings, 3—$3\frac{1}{2}$ lin.

Var. ♂. Stigma unicolorous. Length, $1\frac{3}{4}$ lin.

This species strongly resembles *adunca*, Ruthe, but the 1st segment is shorter, and the antennæ of the ♀ longer. Nees and Ruthe describe the palpi as testaceo-rufous, black at the base; Wesmael, as dull testaceous; those of the English specimens are uniformly dusky. The var. ♂ differs only in size and the colour of the stigma, but may still prove to be a distinct species: the specimen is in Fitch's collection, labelled "*luctuosus*, Hal."; it belongs, however, to the present genus.

Of the genuine *tristis*, Nees, Bignell has bred twenty from *Dianthœcia cucubali*, Fues.; their pupa-state lasted from Sept. 14th to May 22nd. In Ruthe's collection is a specimen from *Plusia moneta*, Fab. Brischke reared it from *Dianthœcia capsincola*, Hüb., *Cucullia verbasci*, L., *C. argentea*, Hufn., and *C. artemisiæ*, Hufn. Besides these, Giraud records it as bred from *Plusia illustris*, Fab., by Bellier de la Chavignerie, and from *Plusia consona*, Fab., by himself. The cocoons are reddish brown or tan-coloured (sometimes greenish, according to Brischke) and not wrinkled, generally adherent to each other; they exactly resemble those of *spectabilis*, Hal.

6. *Microplitis dolens*, n. s.

Atra, palpi fuscis, pedibus rufo-testaceis, femoribus intermediis maximam partem, posticis totis, nigris; tarsis infuscatis. Alæ quales *M. tristi*, fuscæ, aut perpaulo pallidiores, multo tamen saturatiores quam *spectabili*. Feminæ antennæ longiores quam *tristi*, filiformes; maris corpore longiores, setaceæ. Cætera omnino ut in sp. præcedente.

Deep black; palpi dusky; legs rufo-testaceous, three-fourths of the middle and the whole of the hind femora, black; tarsi infuscated. Wings like those of *tristis*, fuscous, or less deeply tinged; but darker than in *spectabilis*. Antennæ ♀ more than three-fourths the length of the body, filiform; those of the ♂ longer than the body, setaceous. The rest as in the preceding species. ♂ ♀. Length, 1¾; wings, 3½ lin.

The clear testaceous tibiæ and the longer antennæ of the ♀ distinguish this from *tristis*, Nees; from *spectabilis*, Hal., it differs in size and in the colour of the wings. There are four specimens, one male and three females. The ♂ belongs to Fitch's collection, and is ticketed "*spectabilis*, Hal."; it might pass for a large var. with unusually dark wings, but corresponds better with the three females. One of these is in the same collection; the other two were taken by me, at Milford Haven and at Nunton, Wilts. Their wings are very dark, and the characters above noted, distinct.

7. *Microplitis spectabilis*, Hal.

Microgaster tristis, var. γ, Nees, Mon., i., 169, ♂ ♀;
M. tristis, var. 1, Wesm., Nouv. Mém. Ac. Brux., 1837, p. 39, ♂ ♀.
M. spectabilis, Hal., Ent. Mag., ii., 236, ♀.
M. parvulus, Ruthe, Berl. ent. Zeit., 1860, p. 139, ♂ ♀.

Black; palpi and legs rufo-testaceous; femora more or less infuscated, anterior coxæ fuscous or testaceous; belly pitchy at the base. Wings nearly hyaline, with a testaceous, or sometimes a dusky, tinge; squamulæ, nervures, and stigma fuscous, the latter at the inner angle determinately yellow. Antennæ ♂ ♀ longer than in *tristis*, sometimes rufescent beneath. Head and mesothorax granulated, obscure; scutellum more shining. Metathorax somewhat produced, rugulose, reticulated, and carinated. Abdomen smooth and shining, only the 1st segment minutely punctulate, subquadrate, with parallel sides and smooth apex, which is broadly rounded. Terebra very short. ♂ ♀. Length, 1¼; wings, 3 lin.

The smallest species; some German specimens, according to Ruthe, being only ¾ lin. long. It most resembles *dolens*, but differs both from that and *tristis* in the colour of the wings, which are very slightly tinted, and by Haliday described as pale ferruginous. The decolorous line which crosses the wing is hardly perceptible. The sides of segments 1—2 are narrowly dull testaceous.

Ruthe possessed 20 males and 36 females, taken between May and June in the neighbourhood of Berlin; Haliday only one ♀, and he says that it is very rare in the north of Ireland. I captured formerly about a dozen in Leicestershire; more recently a male near Abergavenny, and two females in Northamptonshire. Fitch has bred a ♀ at Maldon from an undetermined larva; in Bridgman's collection are four males and six females reared by Norgate from *Trichiosoma betuleti*, Kl.; these are a trifle larger than other specimens. Bred by Dorville from *Dianthœcia capsincola*, Hüb., one ♀ and four cocoons on a card. The cocoons are indistinguishable from those of *tristis*, Nees. According to Brischke bred from *Eupithecia succenturiata*, L., and *exiguata*, Hüb.; but as he says the cocoons are like those of *M. tuberculifera*, Wesm., there is probably some error.

8. *Microplitis mediator*, Hal.

Microgaster mediator, Hal., Ent. Mag., ii., 235; Ruthe, Berl. ent. Zeit., 1860, p. 126, ♂ ♀.

M. fulvicornis, Wesm., Nouv. Mém. Ac. Brux., 1837, p. 44, ♂ ♀.

M. dorsalis, Nees, Mon., i., 170 (♂ only; not of Spin.; the ♀ is a true *Microgaster*, Hal. MS.).

Black; palpi pale; antennæ testaceous, towards the apex more or less fuscous, the scape black; legs testaceous, hind coxæ at the base, and tips of all the tarsi, blackish; abdominal segments 1—2, and base of 3, more or less testaceous, the disk or scutum of 1—2 usually black. Wings yellowish hyaline, dusky towards the tips, omitting the radial areolet; nervures fuscous, stigma black, its basal ⅓ determinately pale. Head, mesothorax, and scutellum granulated, dull; metathorax reticulato-rugose, subcarinated. Segment 1 more than twice as long as broad, attenuated and rounded at the apex, minutely aciculated; the other segments smooth; 2 with two discal impressions converging forwards and enclosing a subtriangular space, which is generally black. Terebra very short. ♂ ♀. Length, 1½; wings, 3 lin.

Var. 1. Scutum of the 1st abdominal segment at the apex, or entirely, pale. Taken by Ruthe as the typical form, but this is not so in England.

Var. 2. Segments 1—3 testaceous, only the scutum of the first black.

Var. 3. Coxæ, base of intermediate femora, and hind femora entirely, blackish.

It would be useless to multiply varieties; the narrow form of the 1st segment, taken in conjunction with the colour of the antennæ, will almost always determine the species.

Two broods, of five and six respectively, were bred by Bignell, June 30th, from larvæ of *Cerastis spadicea*, Hüb. Another set by Dorville from *Eupithecia subfulvata*, Haw. I formerly took several specimens in Leicestershire and at Darenth Wood. Cocoons reddish brown, with some longitudinal wrinkles, clustered together.

Obs. To this species belong the specimens referred to by Reinhard (Berl. ent. Zeit., 1880, p. 360, No. 7) as *M. medianus*, Ruthe, by mistake for *mediator*, Hal. The colour of the antennæ and description of the cocoons render this a certainty. The insects alluded to were reared repeatedly from *Oporina croceago*, Fab., *Xylina furcifera*, Hufn., and *Hadena unanimis*, Tr. The cocoons are described as reddish tan-coloured and naked. Reinhard remarks that in the ♂ the testaceous part of the 2d segment is often much diminished, and that the antennæ vary from testaceous to black.

9. *Microplitis mediana*, Ruthe.

Microgaster medianus, Ruthe, Berl. ent. Zeit., 1860, p. 127.

Black; palpi pale; antennæ black; legs testaceous, hind coxæ and tarsi, sometimes all the coxæ, black; hind femora sometimes tipped with fuscous; abdominal segments 1 at the sides, 2—3 entirely or mostly, and belly at the base, testaceous. Wings dusky hyaline, including the radial areolet; squamulæ testaceous, nervures and stigma blackish, the latter broadly pale at the inner angle. Head, mesothorax, and scutellum granulated, dull; metathorax reticulato-rugose, distinctly carinated. Segment 1 more than twice as long as broad, attenuated and rounded at the apex, minutely aciculated; the other segments smooth; 2 with two discal longitudinal impressions, between which is a slightly raised space. Terebra very short. ♂ ♀. Length, $1\frac{1}{3}$—$1\frac{1}{2}$; wings, $3\frac{1}{4}$—$3\frac{1}{2}$ lin.

Var. 1. Only segment 2 at the sides testaceous.

? Var. 2. Antennæ testaceous, the apex, and scape above, fuscous; wings hyaline, basal third of the stigma, and squamulæ, pale; legs, including the hind tarsi, testaceous; hind coxæ black. Length, $1\frac{1}{4}$—$1\frac{1}{3}$ lin. Ruthe, from four specimens.

Ruthe had eight specimens, but he does not distinguish the sexes. A ♂ bred by me differs only in having longer antennæ, and more dusky wings. The difficulty with this species is how to distinguish its darker varieties from *tuberculifera*, Wesm. It appears that the latter seldom has the 2d segment largely testaceous, and never, perhaps, the 3d. The stigma also of *tuberculifera* is not distinctly pale at the inner angle, but obsoletely, or more generally, unicolorous. No other tangible distinction can be pointed out, and the safest way is to breed the insects. It will then be found that *mediana* is a solitary parasite of young larvæ, and that it makes a greenish-white, almost smooth, cocoon; while *tuberculifera* is only occasionally solitary, and makes grey-brown cocoons, deeply ribbed from end to end.

I have seen fourteen specimens of *mediana*, Ruthe. In addition to those bred, four were taken at Norwich by Bridgman, and two or more formerly by me at Lamport Hall, Northants. Reared singly by Bignell from *Tæniocampa stabilis*, View., and *Polia flavicincta*, Fab.; and by me in 1884 from young larvæ of *Cucullia verbasci*, L. These larvæ were from 4—6 lines long when they produced each a parasite, July 8th—13th; the perfect insects to the number of five (four females and one male) appeared between July 21st and 26th. Brischke says that he bred it from *Melanippe galiata*, Hüb. The greenish-white cocoons are naked and longitudinally, but not deeply, wrinkled.

10. *Microplitis tuberculifera*, Wesm.

Microgaster tuberculifer, Wesm., Nouv. Mém. Ac. Brux., 1837, p. 43, ♂ ♀ (not the vars.); Ruthe, Berl. ent. Zeit., 1860, p. 128, ♂ ♀.

Like the preceding in all respects, except that the stigma is unicolorous, or very narrowly pale at the base. Abdomen black, only the membranaceous sides of segments 1—2, and the belly at the base, testaceous. ♂ ♀. Length, $1\frac{1}{2}$—$1\frac{2}{3}$; wings, $3\frac{1}{2}$—$3\frac{4}{5}$ lin.

Common in autumn; taken frequently by Bignell, Bridgman, myself, and others. Twice bred singly by Bignell from half-grown larvæ of *Tæniocampa miniosa*, Fab. But four from one larva have been reared by Parfitt out of *Eupithecia succenturiata*, L.; their cocoons are clustered together. According to Brischke, bred from *Phlogophora meticulosa*, L., *Eupithecia succenturiata*, L., *E. castigata*, Hüb., and *E. exiguata*, Hüb.; in each case singly, and therefore probably the larvæ were all small. Bred by Giraud from *Apamea basilinea*, Fab., *Triphæna fimbria*, L.; and by Bellier de la Chavignerie from *Agriopis aprilina*, L. The Ruthian collection contains a specimen with the base of the abdomen orange, bred from *Cerastis vaccinii*, L., at Grabow, in Mecklenburg. The cocoons are typical of the genus, and widely different from those of *mediana*, Ruthe. They are ash-coloured, naked, and deeply fluted or ribbed from end to end, like carraway seeds.

11. *Microplitis adunca*, Ruthe.

Microgaster aduncus, Ruthe, Berl. ent. Zeit., 1860, p. 129, ♀.

Deep black; apex of the maxillary palpi testaceous, the rest fuscous; anterior femora at the tips, their tibiæ, and basal half of the hind tibiæ, testaceo-rufous. Wings narrow, infumated; stigma, squamulæ, and nervures fuscous. Antennæ ♀ filiform, not much longer than half the body. Head, mesothorax, and scutellum thickly punctulate, the last, together with the hind edge of the mesothorax, somewhat shining. Metathorax coarsely punctato-rugulose, carinated. Abdomen smooth and shining, segment 1 only showing some minute exarations or scratches; this segment is twice as long as its breadth, scarcely narrowed posteriorly, and rounded at the apex; the apical tubercle very shining. Terebra subexserted, and, with the subtruncated valvula ventralis, not surpassing the anus. ♀. Length, 1½; wings, 3 lin.

The antennæ are very like those of *tristis*, Nees, scarcely longer than the head and thorax; the joints diminish in length towards the apex, so that the few last are as broad as long, but their thickness remains the same; the scape is much thicker than the 1st joint of the flagellum. Segment 1 wholly black, including the membranaceous sides. Belly convex, compressed only at the base, where it shows the usual pellucid piceous spot. Stigma unicolorous. The minute 2d cubital areolet is almost semicircular, surrounded by a thickened nervure. Legs short, stout; hind tibiæ as thick as their femora, and hardly longer than their tarsi.

The unique British specimen answers well to Ruthe's description, except that the posterior tibiæ are more broadly black, having less than their basal half testaceous. It appears very like *tristis*, until the 1st abdominal segment is examined. Ruthe's description was made from a single ♀.

Taken by me on the banks of the Usk, near Abergavenny.

12. *Microplitis borealis*, n. s.

Niger, palpis fuscis, geniculis anticis rufo-testaceis, tarsis tibiisque omnibus fuscis, his summa basi rufescentibus. Ventris basis, segmentorum 1mi 2dique latera testacea. Alæ leviter infuscatæ, squamulis nigris, nervis stigmate nigro-fuscis. Antennæ maris corpore multo longiores, setaceæ. Caput cum mesothorace confertissime punctulatum fere opacum; scutellum paulo lævius; mesothorax subtricanaliculatus, suturis haud penitus obsoletis. Metathorax fortiter reticulato-rugosus, carinatus. Segmentum 1mum duplo longius quam latius, a basi ad apicem attenuatum, rotundato-lanceolatum, sicut cætera lævissimum. Segmentum 2dum basi intra marginis flavedinem utrinque oblique impressum.

Black; palpi fuscous; fore knees rufo-testaceous; all the tarsi and tibiæ fuscous, the latter narrowly rufescent at the base. Base of the belly, and sides of segments 1—2, testaceous. Wings slightly infumated, squamulæ black, nervures and stigma nigro-fuscous. Antennæ ♂ much longer than the body, setaceous. Head and mesothorax very thickly punctulate, hardly shining; scutellum somewhat smoother; mesothorax showing traces of the three sutures. Metathorax coarsely reticulato-rugose, carinated. Segment 1 twice as long as broad, attenuated from the base to the apex, which is lanceolate and rounded; all the segments very smooth. Segment 2 with an oblique impression on each side of the base, within the testaceous margins. ♂. Length, 1½; wings, 3⅓ lin.

The sex is shown by the length and form of the antennæ. It agrees in many respects with *lugubris*, Ruthe, especially the var. with dusky tibiæ; but I doubt its identity with that species, on account of the broad pale margins of the 1st segment, and base of the 2d. If not *lugubris*, it is at least closely allied.

Glenelg, Scotland. The specimen is in Cameron's collection.

v. MICROGASTER (*Latr.*).

Först., Verh. pr. Rheinl., 1862, p. 245; Reinh., Berl. ent. Zeit., 1880, p. 354.

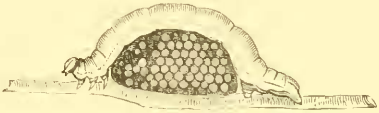
Maxillary palpi 5-, labial 3-jointed. Eyes villose. Antennæ 18-jointed. Mesopleuræ rarely with a rugulose fovea. Abdomen sessile; suturiform articulation distinct. Radius of the fore wing almost complete; three cubital areolets, the 2d often imperfect. Hind coxæ elongate; spurs of the hind tibiæ not shorter than half the metatarsus. Terebra more or less exserted.

Distinguished at a glance from *Microplitis* by the length of the hind spurs, and the distinctness of the suturiform articulation. The genus is placed last in the subfamily, as being upon the whole nearest to the *Agathidides.* It contains the largest and most typical forms, artificially associated, in consequence of the completeness of the 2d cubital areolet, with an inferior group, which might even be made a separate genus, with as much propriety as *Apanteles.*

I. Abdomen narrow, subcompressed, slightly or not at all rugulose at the base. Terebra subexserted. Wings hyaline; radial areolet ample; 2d cubital subtriangular, often incomplete. Hind legs elongate. Middle-sized or minute species, allied to *Apanteles*, Sect. IV.

II. Abdomen broader, deplanate, rugulose at the base. Terebra considerably exserted. Wings coloured; radial areolet narrower; 2d cubital stirrup-shaped, usually complete. Hind legs incrassated. Larger species.

The cocoons of *Microgaster*, so far as they have been observed, are white, or dirty white, glistening, papyraceous, and without a common envelope, or with a very scanty one. In the larger species, after the escape of the insect, one half of the cocoon is usually left semi-transparent, the lining being thrust into the hinder end. Some of the smaller species, which issue in great numbers from the same caterpillar, arrange their cocoons regularly, like the cells of a honeycomb, only their heads are not all turned in the same direction. Such species will always be found to have infested a geometrical larva, and the form of the cake of cocoons is determined by the space left between its body and the support to which it clings, as shown in the annexed outline by Bignell, from a photograph taken after the flies had emerged. We have already seen that one or two species of *Apanteles* arrange their cases similarly. The fact, thus explained, indicates no special instinct on the part of these parasites, being merely an inevitable result.



Cocoons of *M. flavipes* ex *B. repandata.*

Of 23 European species of *Microgaster* described by Ruthe and Reinhard, the following seven have not yet been detected in England:—*nobilis*, Reinh., *sticticus*, Ruthe, *ruficoxis*, Ruthe, *procerus*, Ruthe, *deprimator*, Nees, *Wesmaëlii*, Ruthe, and *dorsalis*, Nees. *M. deprimator*, Nees, which I have taken in the Pyrenees, is conjectured by Ruthe to be a parasite of *Bombus terrestris*, L. If this be correct, its occurrence here is very probable. Brischke says he has bred it from spiders' nests; but this is inconsistent with the known habits of the whole tribe, none of which are external parasites, but live within the body of a single victim larger than themselves.

TABLE OF SPECIES.

SECTION I. First segment distinctly longer than its apical breadth.

(12)	1. Second segment not shorter than the 3d.	
(9)	2. Segment 2 without longitudinal impressed lines on the disk.	
(4)	3. Head and thorax more or less testaceous	1. *alvearius*, Spin.
(3)	4. Head and thorax black.	
(6)	5. Metathorax rugulose; terebra exserted	2. *posticus*, Nees.
(5)	6. Metathorax smooth; terebra very short.	
(8)	7. Legs (except the hind coxæ), and sides of the belly, testaceous; length, 1 line	3. *flavipes*, Hal.
(7)	8. Legs pitchy-fuscous; sides of the belly black; length, ½ line	4. *minutus*, Reinh.
(2)	9. Segment 2 with two impressed longitudinal lines on the disk.	
(11)	10. Metathorax carinated	5. *marginatus*, Nees.
(10)	11. Metathorax canaliculated	6. *calceatus*, Hal.
(1)	12. Second segment much shorter than the 3rd.	

(14) 13. Suturiform articulation curved, concave behind .. .. 7. *connexus*, Nees.
(13) 14. Suturiform articulation straight .. 8. *tiro*, Reinh.

Section II. First segment not, or hardly, longer than its apical breadth.

(18) 1. Segment 2 rugulose.
(7) 2. Abdominal segments 1—3 rugulose.
(4) 3. Abdomen at the base, and coxæ, red 9. *russatus*, Hal.
(3) 4. Abdomen at the base, and at least the hind coxæ, black.
(6) 5. Squamulæ black .. .. .. 10. *rugulosus*, Nees.
(5) 6. Squamulæ rufous .. .. .. 11. *scoticus*, n. s.
(2) 7. Abdominal segments 1—2 rugulose.
(11) 8. Anterior half of the belly testaceous.
(10) 9. Stigma subbicolorous .. .. .. 12. *novicius*, n. s.
(9) 10. Stigma unicolorous .. .. .. 13. *subcompletus*, Nees.
(8) 11. Anterior half of the belly black or pitchy fuscous.
(13) 12. Femora rufous .. .. 14. *globatus*, L.
(12) 13. Femora more or less black.
(17) 14. Antennæ ♀ setaceous.
(16) 15. Wings more or less infuscated; metathorax carinated .. .. .. 15. *tibialis*, Nees.
(15) 16. Wings hyaline; metathorax not carinated .. .. 16. *hospes*, n. s.
(14) 17. Antennæ ♀ filiform .. .. .. 17. *crassicornis*, Ruthe.
(1) 18. Segment 2 smooth.
(20) 19. Segment 2 with two arcuate impressions diverging forwards .. .. .. 18. *spretus*, n. s.
(19) 20. Segment 2 with no such impressions 19. *politus*, n. s.

Section I.

1. *Microgaster alvearius*, Fab.

Ichneumon alvearius, Fab., E. S., Suppl., 232; *Cryptus alvearius*, Fab., Piez., 90.

Microgaster alvearius, Spin., Ins. Lig., ii., 149; Cur., B. E., pl. cccxxi.; Nees, Mon., i., 172; Hal., Ent. Mag., ii., 240; Ratz., Ichn. d. Forst., iii., 50; Ruthe, Berl. ent. Zeit., 1860, p. 153, ♂ ♀. *Cf.* Réau., Mém., ii., 432, pl. xxxv., f. 7; Westw., Int., ii., 148, pl. lxvii., f. 17 (cocoons).

Testaceous, variable; antennæ above, metathorax, disk of the abdomen, belly at the apex, knees of the hind legs, their tibiæ at the tips, and their tarsi, blackish. Wings hyaline, squamulæ pale, stigma and some of the nervures fuscous, the rest colourless. Head, mesothorax, and scutellum finely punctulate. Metathorax smooth, shining, carinulated. Abdomen compressed beneath; segments 1—2 aciculated; segment 1 twice as long as broad, much narrower than 2, which is as long as 3. Terebra subexserted. Valvula ventralis not reaching the anus. ♂ ♀. Length, 1; wings, 2⅓ lin.

Very like *flavipes*, but differently coloured. The sexes are similar. Antennæ about as long as the body, dusky above, the scape testaceous. Pleuræ smooth, punctulate only in front. Pectus infuscated posteriorly. Segment 1 with the sides parallel for about ¾ of its length, thence slightly converging to the truncated apex. Segments 1—3 with yellow lateral margins. Second cubital areolet interrupted and decolorous on the outer side. The white spurs of the hind tibiæ are barely half as long as the metatarsus.

A common autumnal parasite of *Geometræ*. Bred by Fabricius and Curtis from *Rumia luteolata*, L.; by Hofmann of Stuttgart, Dorville, Parfitt, and Bignell, from *Boarmia gemmaria*, Brahm.; the latter bred 95 on Sept. 3rd from a larva taken on August 19th. Parfitt states that he has repeatedly found the cocoons on twigs of the jessamine. Less frequent on the Continent; unknown to Wesmael and Brischke, not seen by Nees, spoken of by Ratzeburg as a rarity, and Ruthe only knew two females received from Ratzeburg. The last writer informs us that it also attacks *Nematus septentrionalis*, L., and has been obtained by Reissig, but females only, from that sawfly; a fact that requires further verification. Cocoons dirty white, regularly disposed in an alveariform mass beneath the victim-larva; the whole mass is bound together by a strip of web round the edge. The same habits belong to the larvæ of *M. flavipes*, Hal., and *minutus*, Reinh.

N.B.—Buckler's references to this species in E. M. M., iv., 252, vi., 165, xiv., 184, are incorrect.

2. *Microgaster posticus*, Nees.

Microgaster posticus, Nees, Mon., i., 172, ♀; Ruthe, Berl. ent. Zeit., 1860, p. 150, ♂ ♀.

M. marginellus, Wesm., Nouv. Mém. Ac. Brux., 1837, p. 29, ♂ ♀.

♀. "Black, slender; palpi and coxæ whitish; antennæ beneath, and mandibles, rufescent; belly and legs pale luteous; hind knees, tips of the hind tibiæ, and hind tarsi, fuscous. Abdomen narrow, varied with luteous in the middle. Wings subhyaline, base and squamulæ luteous, stigma fuscescent. Mesothorax very thickly punctulate; scutellum shining; metathorax rugulose, carinated. Segments 1—2 substriato-rugulose. Terebra hardly as long as ½ the abdomen."

"Head shining, indistinctly punctured; face almost rugose, with short erect hairs, in the middle with a cariniform elevation, somewhat dull, clypeus more shining. Antennæ nearly as long as the body, hairy, fuscous above, reddish testaceous beneath. Pleuræ in front and pectus punctured, with a narrow and hardly crenulate furrow. Segment 1 a little longer than broad, hardly wider behind, the basal half elevated and impressed in the middle; segments 1—2 rugulose, 2 flat, longer than 3; segments 1—2 black, the others more or less fusco-testaceous on the hind margin, seldom almost wholly testaceous. Belly entirely fusco-testaceous, almost whitish at the base. Valvula ventralis large, acuminated. First abscissa of the radius rather obliquely inserted in the stigma; 2d cubital areolet small, complete. Legs stout; trochanters almost whitish; hind coxæ incrassated."—Ruthe.

I have not seen the ♀, from which the ♂ differs in some respects. Abdomen black, the 1st segment edged with yellow at the sides; belly pale at the base. Hind coxæ infuscated above. Segment 1 2½ times longer than broad, margined, with parallel sides, the apex rounded; canaliculated in the middle and impressed with a basal fovea; segment 2 broader than 1, shorter than 3, aciculated in the middle, smoother at the sides. Antennæ longer than the body; scape testaceous at the base; flagellum reddish beneath. Second cubital areolet elongate, incomplete at both ends. Trochanters concolorous with the legs. ♂ ♀. Length, 1⅓; wings, 2¾ lin.

Smaller than *marginatus* and *connexus*, Nees, from which it is distinguished by the rufous hind coxæ, rugulose metathorax, and exserted terebra of the ♀. Ruthe says little about the ♂, and, the proportions of the abdomen differing from those of the ♀, the specimens were for a long time doubtful.

Only two males are now at hand, but sixteen were bred by Bignell from *Porthesia similis*, Fues., July 25th, 1884. Not to be confounded with *M. connexus*, Nees, a commoner parasite of the same moth.

3. *Microgaster flavipes*, Hal.

Microgaster flavipes, Hal., Ent. Mag., ii., 241, ♀; Ruthe, Berl. ent. Zeit., 1860, p. 152, ♂ ♀.

Slender, black; palpi, antennæ beneath, belly at the base, sides of segment 1 narrowly, and legs, pale testaceous; claws and hind coxæ black, the latter sometimes pale at the apex. Wings hyaline, squamulæ and costa testaceous, stigma and nervures pale fuscous, or subferruginous. Head shining, sparingly punctulate; mesothorax thickly punctulate; scutellum smoother. Metathorax and pleuræ smooth, shining, the former carinated. Abdomen compressed beneath at the base, elongate; segments 1—2 aciculated; 1 almost thrice as long as its apical breadth, margined, the sides nearly parallel; 2 as long as 3, narrower at the base than the apex, the margins raised, and converging anteriorly. Terebra subexserted. Valvula ventralis not reaching the anus. ♂ ♀. Length, 1; wings, 2⅓ lin.

The face is somewhat more punctulate than the rest of the head, subcarinated above, in the ♂ more distinctly. Antennæ ♀ about as long as the body, pale testaceous, dusky above and at the apex, the scape black. Ruthe makes segment 1 only 1½ times as long as its breadth, which is certainly incorrect; he also says that the hind femora are black, evidently meaning the hind coxæ. Segments 2, 3 bear vestiges of a medial carina; and 3 is also sometimes subaciculated at the base. Second cubital areolet incomplete on the outer side. Hind coxæ incrassated, punctulate, more strongly in the ♀. Hind femora and tibiæ subinfuscated towards the apex, especially in the ♂.

Haliday had one ♀, taken on a hazel in north Ireland. Since then the species has been repeatedly bred from *Boarmia repandata*, L., by Kriechbaumer and Brischke on the Continent, and by Bignell here (see Entom., xiii., 244). In Fitch's collection is a brood of twenty reared from the same source by Cooper, of Folkestone, June 14th. Brischke also bred it from *Cleora angularia*, Thnb. The cocoons and habits of the larva are the same as those of *M. alvearius.*

4. *Microgaster minutus*, Reinh.

Microgaster minutus, Reinh., Berl. ent. Zeit., 1880, p. 357, ♂ ♀.

Like the preceding, but smaller. Pitchy-black; palpi, antennæ towards the base, and legs, pale testaceous; 4 posterior femora, and hind tarsi more or less, infuscated; hind coxæ fuscous; belly at the extreme base pitchy. Wings hyaline, squamulæ testaceous, stigma fusco-testaceous, almost all the nervures decolorous. Head and mesothorax punctulate, shining; scutellum, pleuræ, and metathorax smooth, shining, the last carinated. Abdomen compressed beneath; segments 1—2 aciculated; 1 twice as long as its breadth, with parallel sides; 2 a little broader than 1, somewhat shorter than 3. Terebra subexserted. Anal forceps of the ♂ exserted. Valvula ventralis ♀ not surpassing the anus. ♂ ♀. Length, $\frac{3}{4}$—1; wings, 2—2$\frac{1}{3}$ lin.

This smallest species of the genus differs from *flavipes*, Hal., in the colour of the legs and belly, as well as the shorter 1st abdominal segment. Antennæ ♀ as long as the body; of the ♂ much longer and stouter. The 2d cubital areolet forms an isosceles triangle whose base is obsolete, so that nothing but the thickening of the other two sides hinders the insect from being joined to *Apanteles*. The spurs of the hind tibiæ are shorter than half the metatarsus.

Reinhard established the species from a pair of unknown origin. Bignell has since reared a brood of thirty from *Cleora glabraria*, Hüb., and in Fitch's collection are a ♂ and ♀ from the same larva, with cocoons of a larger number. The specimens were named by Reinhard himself. Five more broods in the same collection have been destroyed, but their cocoons remain, together with two caterpillars of *glabraria*. Cocoons and habits of the larva similar to those of *M. alvearius* and *flavipes*.

5. *Microgaster marginatus*, Nees.

Microgaster marginatus, Nees, Mon., i., 169, ♀; Ruthe, Berl. ent. Zeit., 1860, p. 155, ♀.

♀. "Black; palpi pale; lateral margins of segments 1—3—4 above and beneath, rufo-testaceous; base of the belly, and sometimes the posterior edges of segments 3, 4, yellowish; legs rufo-testaceous, the hind pair more obscure, their coxæ above more or less, the apex of their femora, their tibiæ at both ends, and their tarsi, black; 4 anterior tarsi black at the tips. Wings dusky hyaline, squamulæ testaceous, stigma and nervures dark fuscous. Antennæ longer than the body, fuscous above, ferruginous beneath, filiform. Mesothorax thickly and finely punctured, dull, scutellum with larger but more scattered punctures; metathorax rugulose, carinated. Segment 1 somewhat widened posteriorly, very little longer than broad, canaliculated, thickly punctato-rugulose; 2 subquadrate, rather longer than 3, finely rugulose, impressed with two longitudinal parallel lines, enclosing a raised cariniform space; 3 coriaceous, its hind margin, with the rest of the segments, smooth and shining. Terebra about $\frac{1}{8}$ the length of the abdomen. Valvula ventralis not surpassing the anus."—Ruthe.

I have not seen the ♀: the undescribed ♂ differs in some respects, as follows:—

♂. Black; palpi, lateral margins of segments 1—2 broadly, and belly at the base, yellowish; legs as in the ♀, but the hind pair are not darker. Antennæ entirely black, much longer than the body. Moderately shining; head, mesothorax, and scutellum thickly punctulate. Segment 1 attenuated from the base to the apex, narrowly truncated, about 3 times as long as its medial breadth, aciculated; 2 as long as 3, with two longitudinal impressed lines enclosing an aciculated space, and an oblique impression near each anterior angle, within the yellow margin; the rest smooth. Hind coxæ elongate, incrassated, thickly punctulate, hairy. Spurs of hind tibiæ straight, shorter than ½ the metatarsus. ♂ ♀. Length, 1⅔; wings, 4 lin.

Described from three males. Their abdomen differs structurally from that of the ♀ in about the same degree as in the case of *posticus*, Nees. *M. calceatus*, Hal., is not a synonym of this species, as given by Reinhard, but of *pubescens*, Ratz. The two species are closely allied, but in *marginatus* the metathorax is longitudinally carinated; in *calceatus*, canaliculated. The resemblance of the ♂ *marginatus* to *Apanteles vitripennis*, Hal., is very striking. The structure of the 1st segment is the same in both, and they are only separated by the areolet, the metathoracic carina, and the 2d segment, of *marginatus*. In fact, the Microgasters of this section are hardly distinct from *Apanteles*. The difference between them is reduced to the areolet, and further attenuated by the fact that many Microgasters have this areolet open on the outer side, while in *Apanteles* it is just as often well defined on the two inner.

One ♂ was bred by Bignell from *Larentia viridaria*, Fab., May 28th. The cocoon preserved with it probably belongs to another insect, being dusky brown, and woolly. Another ♂ was taken by Bignell at Bickleigh, Devon; and the third by me near Teignmouth.

6. *Microgaster calceatus*, Hal.

Microgaster calceatus, Hal., Ent. Mag., ii., 241, ♀.
M. pubescens, Ratz., Ichn. d. Forst., i., 67, ♂; ii., pl. ii., f. 13 (wing); Ruthe, Berl. ent. Zeit., 1860, p. 156, ♀.

Black; palpi flavescent with the apex dusky; lateral margins of segment 1, and 2 partly, belly at the base, and legs, testaceous;

hind coxæ, apex of their femora, their tibiæ at both ends, and their tarsi, black; 4 anterior tarsi blackish at the tips. Wings hyaline, somewhat dusky at the tips; squamulæ testaceous, with a brown spot; stigma and nervures dark fuscous. Antennæ entirely black, longer than the body. Moderately shining; head and mesothorax very finely, scutellum and metathorax more strongly, punctulate, the latter smooth at the apex, and indistinctly bisected by a longitudinal impression. Abdomen shining; segment 1 a little longer than broad, with parallel sides, rounded behind, smooth except a few punctures; 2 as long as 3, punctate, with two longitudinal channels, between which is an obtuse cariniform elevation; suturiform articulation bent, concave posteriorly; segment 3 sometimes with a few punctures. Hind coxæ large, punctulate. Terebra subexserted. Valvula ventralis not surpassing the anus. Spurs of hind tibiæ whitish, longer than ½ the metatarsus. ♂ ♀. Length, 1⅔; wings, 4 lin.

Var. ♀. Anterior coxæ blackish at the base.—Ruthe.

Described from two males and one female. The male has longer antennæ and a more slender abdomen. Haliday's description of *calceatus* agrees with that of *pubescens* by Ruthe much better than with that of *marginatus*, to which it is assigned by Reinhard. Thus Haliday gives the antennæ as entirely black, and says nothing of a carina on the metathorax, as he certainly would have done in speaking of *marginatus*. He describes the wings as dusky at the apex, which is true of this species, but hardly of *marginatus*. The three specimens have the canaliculated metathorax, and are undoubtedly *pubescens*, Ratz.; one of them has also been verified by Reinhard.

A ♀ was bred by Ratzeburg from a young larva of *Ocneria dispar*, L., and sent to Ruthe. In England Raynor has obtained the ♀ at Brandon, June 16th, from *Thera variata*, Schiff.; and Bignell the ♂ from the same victim, June 24th. The second ♂ was reared by Bignell from *Lobophora carpinata*, Bork., April 10th. Cocoons straw-coloured, or dirty yellowish white. Bignell's specimen from *Lobophora* is accompanied by a dark brown cocoon, lighter in the middle, and apparently belonging to an Ophionid.

7. *Microgaster connexus*, Nees.

Microgaster connexus, Nees, Mon., i., 174, ♀.

M. consularis, Hal., Ent. Mag., ii., 241; Ruthe, Berl. ent. Zeit., 1860, p. 158, ♂ ♀.

M. dilutus, Ratz., Ichn. d. Forst., iii., 49, ♀; Bairstow, E. M. M., 1879, p. 116, ♂.

Black; palpi, antennæ towards the base, lateral margins of segment 1, belly at the base, and legs, testaceous; hind femora and tibiæ at the apex, with their tarsi, blackish; hind coxæ often infuscated above; anterior tarsi tipped with fuscous. Wings subhyaline, squamulæ testaceous, nervures and stigma fuscous; the last with the inner angle pale only in the ♀. Head in front, and thorax, very thickly punctulate; metathorax more or less rugulose, carinated. Abdomen, except segments 1—2, smooth and shining; segment 1 twice as long as broad, with parallel sides, elevated from the base to the middle, rounded at the apex, finely striolated, sometimes almost smooth; 2 broader than 1, shorter than 3, also striolated, its fore and hind margins curved, preserving a uniform distance from each other; the remaining segments have a few minute punctures. Hind coxæ punctulate. Terebra subexserted. Valvula ventralis truncated before reaching the anus. ♂ ♀. Length, 1½; wings, 3½ lin.

The antennæ of the ♂ are a little longer than those of the ♀, and almost entirely black, except the scape. This and the next species are easily known by having the 2d segment distinctly shorter than the 3d. The rufous coxæ, bicolorous stigma of the ♀, &c., combine to render *connexus* unmistakable.

A common parasite of *Porthesia similis*, Fues., and in that respect resembling *M. posticus*, Nees. Reared in Germany by Nördlinger and Kriechbaumer. Bignell has obtained several large broods of both sexes; one of 18 individuals hatched August 18th, having been 37 days in the pupa-state; another, of 24, occupied the same number of days. In Fitch's collection are the remains of another brood. Nees v. Esenbeck, who only knew the ♀, assigns this parasite to a different victim, *Spilosoma fuliginosa*, L., and agrees with Ruthe and Haliday in stating that the caterpillar spins a covering for the protection of the Microgasters, mixed with its own dusky hairs; *cf.* Haliday, *l. c.*, note. This can only mean that the parasites did not cause the death of their victim until the latter had begun to weave its own pupa-case. In the instances observed by Bignell the larva perished before attempting pupation. Cocoons white, with a satiny sheen, and slightly woolly. Brischke obtained only one parasite from a larva of *Porthesia*, and another from *Acronycta tridens*, Schiff., which he assigns to this species, calling the cocoon light brown, perhaps only another way of expressing impure white.

8. *Microgaster tiro*, Reinh. (Pl. VI., fig. 2).

Microgaster tiro, Reinh., Berl. ent. Zeit., 1880, p. 357, ♂ ♀.

Black; palpi pale; antennæ sometimes rufescent beneath; 4 anterior legs testaceous; hind legs blackish, with the trochanters, and base of the femora, of the tibiæ, and of the tarsi, testaceous; middle coxæ at the base, hind coxæ entirely, black. Lateral margins of segment 1, and base of the belly laterally, but not in the middle, testaceous. Wings hyaline, squamulæ and costa testaceous, nervures and stigma fuscous, the latter pale at the inner angle. Antennæ of the ♀ as long as the body; of the ♂, longer· Head, mesothorax, and scutellum shining, almost invisibly punctulate; pleuræ smooth; metathorax subrugulose, rather shining, carinated. Segments 1—2 punctato-rugulose; segment 1 wider than in any of the preceding species, about $1\frac{1}{2}$ times as long as broad, with parallel sides, excavated at the base, truncated at the apex; 2 broader than 1, half as long as 3, obliquely truncated at the anterior angles; suturiform articulation straight. Terebra longer than $\frac{1}{2}$ the abdomen. Valvula ventralis subacuminated, somewhat surpassing the anus. Hind legs elongate, their femora and tibiæ incrassated. ♂ ♀. Length, $1\frac{1}{3}$; wings, 3 lin.

Intermediate between the present section and the typical Microgasters which follow. In the length of the 1st segment it resembles the former; in the breadth of the same segment, the compact form of the body, and length of the terebra, it approaches the latter.

Described from two males and one female. One male is in Fitch's collection, bred by Raynor, June 27th, from a *Tortrix*-larva feeding on chamomile. From this same larva issued a second and different parasite, *Apanteles emarginatus*, Nees. Another ♂ was bred by Fitch, April 26th, also from an unknown *Tortrix*-larva. The ♀ was captured by me in Northamptonshire. Cocoons white.

SECTION II.

9. *Microgaster russatus*, Hal. (Pl. VI., fig. 1).

Microgaster russatus, Hal., Ent. Mag., ii., 237; Ruthe, Berl. ent. Zeit., 1860, p. 109, ♂ ♀.

M. basalis, Ste., Ill. M., vii., Suppl. 4, pl. xxxvii., f. 1, ♀.

M. dimidiatus, Wesm., Nouv. Mém. Ac. Brux., 1837, p. 28, ♂; pl., f. A (abdomen).

Black; palpi, flagellum, abdominal segments 1—3, belly, and legs, rufous; hind tibiæ at the apex, and their tarsi, more or less infuscated; claws black. Wings fusco-ferruginous, the basal half and the radial areolet more testaceous; 1st abscissa of the radius clouded; squamulæ, nervures, and stigma fuscous, the last at the inner angle determinately luteous. Head and thorax thickly punctulate, but somewhat shining; scutellum smooth; metathorax rugose, with or without a medial carina. Segments 1—3 rugulose; 1 subquadrate, its basal angles rounded, with an impression between them, the apex truncate; 2 transverse, longer than 3, both feebly carinated in the middle; the rest smooth and shining. Terebra hardly ¼ of the abdomen; valves subclavate. Inner spur of the hind tibiæ half as long as the metatarsus. ♂ ♀. Length, 2—2½; wings, 4—5 lin.

Antennæ ♀ as long as the body, the two basal joints black; flagellum mostly fusco-ferruginous, the apex sometimes testaceous. Those of the ♂ are 4 lines long, and much darker. Face and clypeus granulated, dull; mandibles ferruginous, darker at the tips. Mesothorax depressed in the middle, and there almost rugulose, with vestiges of the thoracic sutures. Pleuræ and pectus punctate, the former smooth above the usual fovea. Abdomen ♂ longer than the thorax, depressed, with parallel sides; of the ♀ shorter and more rounded; the apical black segments taken together are not so long as the 1st segment. The wings of the ♂ are lighter than those of the ♀, which latter have a deeper stain beneath the stigma.

The most conspicuous species of this subfamily, and rare; the British Museum contains one male from Haliday (Ent. Soc. Coll.), two males and one female from Stephens' collection, and three males from that of Desvignes. Ruthe had inspected five males and two females from Berlin, Danzig, and Oranienburg; Wesmael captured a male near Brussels, and two others are recorded by S. v. Vollenhoven, taken at Rotterdam and the Hague. Haliday found both sexes very scarce on the muddy coasts of north Ireland. I have seen two males taken by Billups at High Beech, Epping Forest. Brischke bred this species from *Orthotelia sparganella*, Thnb. Cocoons white, woolly, transparent.

10. *Microgaster rugulosus*, Nees.

Microgaster rugulosus, Nees, Mon., i., 163, ♂; Ruthe, Berl. ent. Zeit., 1860, p. 112, ♂.
M. infumatus, Hal., Ent. Mag., ii., 237, ♂.
M. opacus, Ruthe, *lib. cit.*, 1858, p. 5; and 1860, p. 111, ♀.

♀. Black; mandibles, abdominal segments after the 3d, and belly, reddish luteous; palpi and legs testaceo-rufous; coxæ and claws black. Wings infumated; squamulæ black; nervures and stigma fuscous, the latter nearly black. Body thickly punctulate, dull; scutellum shining, slightly punctulate; metathorax subreticulato-rugulose, carinated. Abdomen subovate, depressed; segments 1—3 dull, finely and densely rugulose; 1 impressed at the base; 2 twice as long as 3; the rest smooth; belly carinated. Terebra scarcely ¼ of the abdomen. Spurs of hind tibiæ shorter than ½ the metatarsus. Valvula ventralis acuminated.

♂. Antennæ rufo-fuscous beneath; abdomen black at the apex; hind tibiæ sometimes at both ends, with their tarsi, fuscous. Metathorax more strongly reticulato-rugose. Abdomen somewhat longer than the thorax, hardly convex, with parallel sides; segment 1 impressed with a furrow; 3 hardly more than half as long as 2; the other segments obsoletely punctulate, shining, together not much longer than the 2d. Wings fuscous. ♂ ♀. Length, 1¾—2; wings, 3½—4 lin.

Antennæ ♀ fuscous, filiform, the scape black. Pectus and pleuræ thickly ruguloso-punctulate, the latter above the longitudinal furrow, smooth and shining. Segment 1 coarsely rugose, almost reticulated, 2—3 more finely; 1, 2 of nearly equal length; 2 broader than 3 and about twice as long; 3 at the apex, and all the remaining segments, more or less reddish luteous. Coxæ at the apex and underneath rufo-testaceous; hind tibiæ at the base somewhat infuscated. The ♂ differs in the colour of the abdomen, the antennæ are ½ longer than the body, the wings darker, and the legs varied with black.—Ruthe.

This species, of which Fitch possesses two males, is next in size to *russatus*, Hal., and apparently still rarer in England; there is a ♂ in the British Museum from Desvignes' collection. The only specimens of which any notice exists were bred by Curtis singly from half-grown larvæ of *Acronycta rumicis*, L., taken at Dover. The confused account of them given in B. E., 321, No. 1, seems to mean that three of the parasites became pupæ in August, two of these hatched in September, and the third remained a pupa till the following May. One of these was the ♂ described by Haliday. Curtis saw in them the *M. deprimator*, Fab. and Panz., which is incorrect; neither is Panzer's fig. (F. G., lxxix., 11) a ♀, as he states it to be. On the Continent the species is better known; Nees had a ♂ from Berlin; Ruthe a male and two females from Freienwalde and Danzig; and Reinhard speaks of a plurality of specimens examined by him.

11. *Microgaster scoticus*, n. s.

Niger, palpis, ventris lateribus juxta basin, segmentique 2di margine utrinque, flavo-testaceis; pedibus cum coxis 4 anterioribus rufis. Femora postica apice summo, coxæque posticæ, nigra; tarsi omnes rufi, unguiculis fuscis. Alæ subfumato hyalinæ, squamulis testaceis, nervis fuscescentibus, stigmate fusco; fascia sub stigmate, et apice, paulo obscurioribus. Antennæ crassæ, corpore fere duplo longiores. Caput nitidum, vix punctulatum. Mesothorax et scutellum confertissime punctulata, vix nitida. Metathorax punctato-rugosus, carinatus. Abdomen breve, coxis posticis cum trochanteribus non longius; segmentis 1—2 punctato-rugosis, 3tio exarato. Segmentum 1mum vix longius quam latius, basi excavatum, perpaulo angustatum, longitudinaliter canaliculatum, apice rotundato-truncatum; 2dum 3tio parum longius, hoc nitidum quidem, sed distincte exaratum et vage punctatum; cætera lævissima. Areola cubitalis 2da subcompleta. Calcaria postica crassa, metatarsi dimidio longiora.

Black; palpi, sides of the belly near the base, and lateral margins of segment 2, flavo-testaceous; legs, with the 4 anterior coxæ, rufous; hind coxæ, and extreme tips of the hind femora, black; all the tarsi rufous, with black claws. Wings subhyaline, slightly infumated; squamulæ testaceous; nervures and stigma fuscous, the latter darker; a blotch under the stigma, and the apex of the wing, also darker. Antennæ stout, almost twice as long as the body. Head shining, scarcely punctulate. Mesothorax and scutellum very thickly punctulate, hardly shining. Metathorax punctato-rugose, carinated. Abdomen short, not longer than the hind coxæ with their trochanters; segments 1—2 punctato-rugose, 3 faintly rugulose. Segment 1 hardly longer than broad, excavated at the base, and very slightly narrowed, longitudinally canaliculated, rounded and truncate at the apex; 2 scarcely longer than 3, which last is somewhat shining, although distinctly subrugulose and vaguely punctate; the other segments very smooth. Second cubital areolet almost complete. Spurs of hind tibiæ stout, longer than ½ the metatarsus. ♂. Length, 1½; wings almost 4 lin.

Distinguished from the two preceding by having testaceous squamulæ; with them it has little affinity, except the sculpture of the 3d segment. The antennæ are very stout, compressed, and, though broken, still nearly twice as long as the body. The abdomen is unusually small; belly pitchy-black, with a yellow pellucid streak on each side beneath segments 1—2; segment 1 is narrowly edged with yellow, 2 more broadly; 3 is much less coarsely sculptured than 1—2, but cannot be regarded as smooth. Legs elongate, stout; middle tibiæ longer than their tarsi, their spurs as long as the metatarsus; spurs of the hind tibiæ very stout, shorter than the metatarsus. Anal forceps exserted, pale testaceous. Areola complete, except at the outer lower angle.

One specimen taken in Scotland by Cameron.

12. *Microgaster novicius*, n. s.

Niger, palpis, segmentorum 1—2 lateribus, supra anguste, latius infra, testaceis; pedibus præter coxas et trochanteres superos rufo-testaceis; femorum posticorum apice ipso, tibiis iisdem tarsisque, infuscatis. Alæ fusco-hyalinæ, squamulis piceis; nervis, stigmate, fuscis, hoc bicolore. Caput et mesothorax nitida, subtilissime punctulata; scutellum læve; metathorax carinatus et segmenta 1—2 punctato-rugulosa. Segmentum 1mum subquadratum, basi haud angustatum; 2dum 3tio æquale, hoc et seqq. lævia, nitida. Terebra abdominis quadrantem æquans. Valvula ventralis acuminata, anum superans. Calcaria postica metatarsi dimidio paulo breviora.

Black; palpi, margins of segments 1—2 narrowly above, beneath more broadly, testaceous; legs, except the coxæ and upper trochanters, rufo-testaceous; extreme tips of the hind femora, with their tibiæ and tarsi, infuscated. Wings fusco-hyaline, squamulæ pitchy; nervures and stigma fuscous, the latter bicolorous. Head and mesothorax shining, very minutely punctulate; scutellum smooth; the carinated metathorax, and segments 1—2, punctato-rugulose. Segment 1 subquadrate, not narrowed at the base; 2 as long as 3, which, with all the rest, is smooth and shining. Terebra ¼ of the abdomen. Valvula ventralis acuminated, surpassing the anus. Spurs of the hind tibiæ rather shorter than ½ the metatarsus. ♂ ♀. Length, 1¼; wings, 2⅘ lin.

The species may be known by the stigma, which is indeterminately pale at the inner angle, and the very smooth thorax and scutellum, the former being almost invisibly punctulate in front only. In one specimen segments 3—4 are narrowly bordered behind with testaceous. The belly is black, the edges of its segments piceous, and near the base is the usual pellucid lateral spot. The terebra, viewed from above, projects very little beyond the abdomen. The antennæ of the ♂ are not much longer than those of the ♀, which are not much longer than the body. Wings hyaline at the base, towards the apex somewhat dusky; 2d cubital areolet triangular. Hind tibiæ pale at the base.

There are five specimens, three males and two females, in Cameron's collection; one of the cards is marked "Cadder."

13. *Microgaster subcompletus*, Nees.

Microgaster subcompletus, Nees, Mon., i., 165; Wesm., Nouv. Mém. Ac. Brux., 1837, p. 33; Ruthe, Berl. ent. Zeit., 1863, p. 114, ♂ ♀.
M. annulipes, Hal., Ent. Mag., ii., 238, ♀.

Black; palpi pale, with the basal joint black; antennæ rufescent beneath; belly testaceous or pale pitchy, darker behind; segment 2 margined laterally with testaceous; legs rufous, except the coxæ and upper trochanters; hind femora and tibiæ at the apex, with their tarsi, fuscous, the joints of the tarsi rufous at the base. Wings subfumato-hyaline, darker at the apex; squamulæ and stigma blackish, nervures fuscous. Face not shining, finely and transversely rugulose. Mesothorax and scutellum shining, minutely punctulate; metathorax punctato-rugulose, carinated, the hinder angles somewhat produced. Abdomen depressed; segments 1—2 substriato-rugulose; 1 subquadrate, very slightly narrowed at the base, margined; 2, 3 subequal, transverse; 3 and the following smooth and shining, 3 however is very faintly aciculated. Terebra ⅓ or ¾ of the abdomen; valves almost linear. Valvula ventralis subacute, not surpassing the anus. Spurs of hind tibiæ longer than ½ the metatarsus. ♂ ♀. Length, 1⅔—2; wings, 3⅔—4⅓ lin.

The resemblance of this species to the next is very close, but it may be distinguished by the following characters:—It is more slender and depressed; the antennæ are not so stout, the flagellum is more or less rufous underneath, and the apical joints are almost twice as long as broad; the mesopleuræ and pectus are less visibly punctulate; the metathorax more finely rugulose; segment 2, and sometimes 1, is narrowly margined with testaceous; the belly in front is pale instead of black; segment 3 is never absolutely smooth, but always slightly aciculated; the terebra is longer and more slender; the hind femora and tibiæ are always dusky at the apex, and the joints of the tarsi testaceous at the base; the wings are more ample, and the 2d cubital areolet, if completed, would not be stirrup-shaped, as in *globatus*, but triangular.

Common; usually attacking *Vanessa Atalanta*, L., and several times bred by Bignell, as also by Norgate, Fitch and Sotheby, and by Giraud in France. Bignell has also obtained it from *Hypena proboscidalis*, L.; and Elisha from *Dicrorrhampha tanaceti*, Ste. A single ♀ bred by Elisha from *Sericoris euphorbiana*, Freyer, June 9th, is only 1½ lin. long, and its terebra one-third the length of the abdomen. According to Reinhard it likewise infests *Vanessa cardui*, L., *Cucullia scrophulariæ*, Esp., *C. verbasci*, L., and *Spilodes verticalis*, L. Brischke bred it from *S. verticalis*, L., and *Phoxopteryx derasana*, Hüb.; Giraud from *Acronycta rumicis*, L., and *Tortrix viridana*, L. Cocoons white, somewhat woolly, and with one half more opaque than the other.

14. *Microgaster globatus*, Nees.

Microgaster globatus, Nees, Mon., i., 163; Hal., Ent. Mag., ii., 237; Wesm., Nouv. Mém. Ac. Brux., 1837, p. 31, pl., f. c; Ruthe, Berl. ent. Zeit., 1860, p. 120, ♂ ♀. The synonymy found in all older writers is doubtful.

Black; palpi pale, with 2 basal joints dusky; antennæ wholly black; belly black, or only slightly pellucent at the base; legs rufous, except the coxæ and upper trochanters; hind femora sometimes at the apex, with their tarsi, fuscous. Wings fumato-hyaline, darker at the apex, squamulæ and stigma blackish, nervures fuscous. Face dull, thickly punctulate. Mesothorax and pleuræ finely and thickly punctulate, subrugulose; scutellum more sparingly, rather shining; metathorax rugulose, subreticulated, carinated. Abdomen more or less depressed, somewhat narrowed at the base and apex; segments 1—2 rugose, subreticulated, margined; segment 1 subquadrate, 2—3 subequal, transverse; 3 and following smooth and shining. Terebra shorter than ½ the abdomen. Valvula ventralis acuminated, not surpassing the anus. Spurs of hind tibiæ longer than ½ the metatarsus. ♂ ♀. Length, 1⅔—2; wings, 3⅔—4⅓ lin.

Var. Legs unicolorous, rufous, &c. *Microgaster rufipes*, Nees, Mon., i., 164, ♂ ♀; *M. subincompletus*, Ratz., Ichn. d. Forst., iii., 49, ♂.

The stout antennæ of the ♀ are about as long as the body; the ♂ differs only in having them longer and more setaceous, and a more depressed abdomen. The base of the clypeus, and tips of the mandibles, are rufescent. Labial palpi sometimes dusky. Wings sometimes almost hyaline, tinged towards the base and on the costa with testaceous. The hind femora, and, less often, their tibiæ, are liable to be fuscous, or even black, at the tips, and the same tibiæ are generally very pale at the base. A var. with the fore femora black at the base is conjectured by Ruthe to be *M. anthomyiarum*, Bouché (Naturg., 1834, 160); and those with more hyaline wings are *M. amentorum*, Ratz. (i., 68). The difficulty of recognising the present species, as well as the preceding and following, is very great, in consequence of slight variations. Ruthe states the result of his experience to be, that uniformity in the colour of the legs and wings always prevails in the same brood; in another brood from the same species of larva will be seen, perhaps, a small variation; while a brood proceeding from a different species will present more marked deviations, not only in colour, but in size, form, and degree of punctuation. Individuals occur with the femora and tibiæ more or less blackened, which can neither be referred with certainty to this species, nor to *tibialis*, Nees, and, as their cocoons are indistinguishable, it is rnot vey unlikely that the two species ought to be united.

Like *tibialis*, Nees, it seems to be a solitary parasite of the smaller moths, and therefore cannot be the *Ichneumon globatus*, L.; there are, however, hardly any bred specimens at hand. A ♀ in Fitch's collection was bred by Elisha, June 9th, from *Sericoris euphorbiana*, Freyer, a ♂ from *Conchylis Smeathmaniana*, Fab., May 16th; and S. v. Vollenhoven reared one from *Spilodes verticalis*, L., in July. Brischke bred it singly from *Eupithecia linariata*, Fab., *E. campanulata*, Schäff., *Spilodes verticalis*, L., and *Tachyptilia populella*, Clerck. Ratzeburg's *M. amentorum* was bred singly in some numbers from the foreign *Tortrix amentana*, Ratz.; and by Brischke from *Phlœodes immundana*, Fisch. The dubious *M. anthomyiarum*, Bouché, was obtained from *Anthomyia ceparum*, Bouché. Cocoon white, not woolly.

15. *Microgaster tibialis*, Nees.

Microgaster tibialis, Nees, Mon., i., 168; Ste., Ill. M., vii., Suppl. 3, pl. xxxvii., f. 2; Wesm., Nouv. Mém. Ac. Brux., 1837, p. 35; Ruthe, Berl. ent. Zeit., 1860, p. 122, ♂ ♀.
M. nigricans, Nees, Mon., i., 167, ♂.
M. meridianus, *messorius*, ♂ ♀, and *luctuosus*, ♂, Hal., Ent. Mag., ii., 239.

Black, including the palpi, or these may only be black at the base; legs also black, or black and red in various proportions. Wings infumated, paler at the base; squamulæ black, nervures and stigma fuscous. Antennæ subsetaceous. Face dull, thickly punctulate. Body rather shining; mesothorax finely and thickly punctulate; metathorax and segments 1—2 rugose, the former carinated. Terebra shorter than ½ the abdomen. ♂ ♀. Length, 1¼—2; wings, 2¾—4⅓ lin.

All writers agree in separating this from *globatus*, Nees, although no intelligible difference can be pointed out, except the colour of the legs. The structure of both forms is the same, and subject to the same variations; usually the ♀ of *tibialis* is a little more slender, but sometimes the reverse is the case. So also with respect to the rugosity of the metathorax and abdominal segments. The antennæ appear a little shorter than those of *globatus*, and the last joints are subquadrate. The wings are more or less deeply tinged; sometimes almost hyaline. As to the legs, the only remaining means of distinction, they are (at least the hind pair) either altogether black, or the femora only; or the femora are rufous with black streaks, or finally altogether rufous, in which case the species become merged in *globatus*. The following are the leading varieties:—

Var. 1, *M. ambiguus*, Ruthe. Metathorax and segments 1—2 finely rugulose; palpi testaceous with the basal joint dusky; legs rufous, coxæ and hind tarsi black. Length often only 1½ lin.

Var. 2, *M. maculatus*, Ruthe. Metathorax and segments 1—2 more or less finely rugulose; palpi testaceous, or dusky at the base;

femora black at the base, or with a black stripe above and beneath, most conspicuous on the middle, and least on the hind pair. Length, about 1⅔ lin.

Var. 3, *M. vulgaris*, Ruthe. Metathorax and segments 1—2 more finely rugulose; coxæ and femora black; fore femora with the apical half, middle femora only at the tips, and hind femora entirely, black or fuscous; anterior tibiæ and tarsi entirely rufous; hind tibiæ at the tips, and their tarsi, generally black, or the last wholly rufous. Length, 1⅔—2 lin.

Var. 4, *M. luctuosus*, Hal., ♂. Palpi fuscous; fore legs with the knees, tibiæ, and tarsi, rufescent; middle tibiæ the same with the apex fuscous; hind tibiæ rufescent only at the base; wings very dark; lateral margins of segment 1 narrowly testaceous. Length, 2 lin.

Very common. A solitary parasite of small Lepidoptera. Bred by Bignell from *Emmelesia decolorata*, Hüb. The pupæ were buried during the winter. A ♀ in Fitch's collection, answering to *messorius*, Hal. (tibiæ testaceous, wings very dark), was reared by Elisha, June 9th, from *Peronea Shepherdana*, Ste. Brischke bred it from *Tachyptilia populella*, Clerck. I possess 19 specimens, including most of the above varieties, collected throughout the country, from Rannoch to the Isle of Wight. Cocoons white.

16. *Microgaster hospes*, n. s.

Niger, palpis fuscis, tibiis rufis; femoribus feminæ anterioribus apice, posticis etiam lateribus, rufis, maris totis nigris. Alæ hyalinæ, squamulis nigris, nervis et stigmate ferrugineo-fuscis. Caput cum mesothorace nitidum subtilissime confertim punctulatum; scutellum læve; metathorax et segmenta 1—2 punctato-rugulosa, ille haud carinatus. Segmentum 1mum subquadratum, basi non angustatum; 2dum 3tio æquale, hoc et seqq. lævia nitida. Terebra abdominis dimidio æqualis, curvata, valvulis clavatis. Valvula ventralis magna, picea, acuta, anum non superans. Pedes quam *M. novicio* crassiores, breviores, præsertim feminæ. Calcaria postica metatarsi dimidio breviora.

Black; palpi fuscous, tibiæ rufous; anterior femora of the ♀ at the apex, hind femora also at the sides, rufous, those of the ♂ entirely black. Wings hyaline, squamulæ black, nervures and stigma reddish fuscous. Head and mesothorax shining, thickly and very finely punctulate; scutellum smooth; metathorax and segments 1—2 punctato-rugulose, the former not carinated. Segment 1 subquadrate, not narrowed at the base; 2 as long as 3, which, with the remaining segments, is smooth and shining. Terebra as long as ½ the abdomen, curved; the valves clavate. Valvula ventralis large, pitchy, acute, not surpassing the anus. Legs stouter and shorter than those of *M. novicius* (sp. 12), especially in the ♀. Hind spurs shorter than ½ the metatarsus. ♂ ♀. Length, 1½; wings, 3½ lin.

Described from one male and two females. The belly is not pale at the base. Antennæ ♀ setaceous, attenuated towards the apex. Certainly distinct from *globatus-tibialis*, having a different facies; the wings are hyaline, or nearly so; the metathorax is without a carina, the terebra somewhat longer, and its valves more clavate.

From Scotland; Cameron's collection.

17. *Microgaster crassicornis*, Ruthe.

Microgaster Spinolæ, Hal., Ent. Mag., ii., 238, ♂ ♀ (not of other authors).

M. crassicornis, Ruthe, Berl. ent. Zeit., 1860, p. 124, ♀.

Black; palpi blackish; legs rufo-testaceous, coxæ, trochanters, femora at the base, and tarsi, black. Wings infumated, squamulæ black, nervures and stigma fuscous. Antennæ ♀ filiform, stout, hirsute, the 3 penultimate joints subquadrate; of the ♂ stouter, longer than the body, subsetaceous. Face thickly punctulate, gibbous above the clypeus. Mesothorax and scutellum smooth and shining. Pleuræ sparingly punctulate in front. Metathorax and segments 1—2 rugulose, subreticulated, the former carinated. Segment 1 subquadrate, narrowed at the base, with a shining tubercle at the apex; 3 and following smooth, shining. Terebra almost ½ the abdomen; valves stout, subclavate. Valvula ventralis acuminated, not reaching the anus. Legs stout; spurs of hind tibiæ as long as ½ the metatarsus. ♂ ♀. Length, 2; wings, 4¼ lin.

This, like the preceding, is not easily distinguished from *tibialis*. It equals the largest of that species in size; the antennæ of the ♀ are of uniform thickness to the apex, rather shorter than the body, and beset with black hairs. Face covered with hoary pubescence. The chief distinction in both sexes is the smoothness of the thorax, without visible punctures as in *globatus-tibialis*. The rufous legs appear not to vary much; the fore femora are black at the base more or less, the 4 posterior have a black basal streak above and below, broader on the middle pair, which are sometimes altogether black.

Haliday calls the palpi rufous, but this is within the limits of usual variation.

Found rarely by Haliday on muddy coast of north Ireland. In Cameron's collection are two males and three females from Glenlyon, Scotland; also captured by Sharp at Thornhill, and by me formerly at Loch Rannoch. Brischke bred it at Danzig from *Eupithecia campanulata*, Schäff., and describes the cocoon as solitary, thin, silky, white.

18. *Microgaster spretus*, n. s.

Niger, palpis pallidis, pedibus anterioribus rufo-testaceis, posticis piceis, tibiis iisdem medio rufescentibus, coxis omnibus nigris, tarsis anterioribus apice ipso, posticis totis, fuscis. Alæ hyalinæ, squamulis, nervis, stigmate, piceis. Antennæ perbreves, capite cum thorace vix longiores, submoniliformes. Corpus totum subnitidum. Caput subtilissime, mesothorax fortiter confertim punctulatus; scutellum medio læve; metathorax subtiliter dense punctulatus, carinatus. Segmentum 1mum vix longius quam latius, lateribus fere parallelis, ruguloso-punctatum, truncatum, apice medio emarginatum, longitudinaliter canaliculatum; segmentum 2 et seqq. lævia, nitida, illud canaliculis 2 arcuatis antice divergentibus in longitudinem tripartitum, articulatione suturiformi curvata, postice concava. Terebra brevissima. Valvula ventralis anum non attingens. Pedes breves, crassi; posticorum calcar internum metatarsi dimidio multo longius.

Black; palpi pale; 4 anterior legs rufo-testaceous, hind legs piceous, their tibiæ rufescent in the middle; all the coxæ black; anterior tarsi at the tips, hind tarsi wholly, fuscous. Wings hyaline, squamulæ, nervures, and stigma fuscous. Antennæ very short, hardly longer than the head and thorax, submoniliform. Body rather shining. Head very finely, mesothorax thickly and more strongly, punctulate; scutellum smooth in the middle; metathorax thickly and finely punctulate, carinated. Segment 1 hardly longer than broad, the sides nearly parallel, ruguloso-punctate, truncated, emarginate behind in the middle, longitudinally canaliculated; segment 2, and the rest, smooth and shining; 2 longitudinally trisected by two curved impressed lines which diverge in front; suturiform articulation curved, concave behind. Terebra very short. Valvula ventralis not reaching the anus. Legs short, stout; inner spur of hind tibiæ much longer than ½ the metatarsus. ♀. Length, 1¼; wings, 2⅔ lin.

This and the following species are very distinct from all described Microgasters, having the 2d segment smooth, and free from rugosity.

Anterior legs somewhat dull testaceous; hind pair piceous, with pale trochanters, and their tibiæ somewhat reddish in the middle. Belly black, except a pellucid lateral basal spot. Antennæ unlike those of any other species; all the joints are short, and, after the 4th, moniliform, slightly tapering towards the apex, and not longer than broad. Second segment shining, with only a few scattered punctures; divided into 3 lobes by two arcuate channels which commence near one another on the hind margin and diverge to the anterior angles. Four anterior legs very short, their tarsi longer than the tibiæ, and the spurs almost as long as the metatarsi; hind legs incrassated and longer, their spurs also nearly equal to the metatarsi. Areolet minute, incomplete on the outer side, the other 2 sides closely approximated, and, with the 1st abscissa of the radius, much incrassated; outer nervures decolorous.

The only specimen was bred by Bignell from *Rhodophæa consociella*, Hüb. Cocoon not preserved.

19. *Microgaster politus*, n. s.

Ater, palpis pallidis basi fuscis, ventre toto pedibusque nigris, his flavo-variis. Alæ hyalinæ, apicem versus subinfuscatæ; squamulæ nigræ; nervi cum stigmate fusci; areola cubitalis 2da triquetra, modo non completa. Corpus totum nitidum. Caput, mesothorax, scutellum, subtilissime parcius punctulata, fere lævia. Metathorax subrugulosus, haud carinatus. Abdomen depressum, ventre leviter convexo, basi compresso; segmentum 1mum non longius quam latius, basi impressum, marginatum, subtilius striolatum, apice rotundato-truncatum; segmentum 2dum transversum, 3tio æquale, marginatum, cum cæteris lævissimum. Pedes subgraciles; calcaria postica metatarsi dimidio paulo longiora.

Deep black; palpi pale, fuscous at the base; belly entirely, and legs black, the latter partly flavo-testaceous. Wings hyaline, somewhat dusky towards the apex; squamulæ black; nervures and stigma fuscous; areolet triangular, almost complete. Entire body shining. Head, mesothorax, and scutellum rather sparingly and very finely punctulate, almost smooth. Metathorax subrugulose, not carinated. Abdomen depressed, belly convex, compressed at the base; segment 1 not longer than broad, impressed at the base, margined, finely striolated, rounded and truncate at the apex; 2 transverse, as long as 3, margined, and very smooth, like all the rest of the segments. Legs rather slender; spurs of hind tibiæ a little longer than ½ the metatarsus. ♂. Length, 1⅓; wings, 3⅓ lin.

Remarkakle on account of the smoothness of the 2d abdominal segment. It resembles *Apanteles longicaudis* ♂, with the wings of a *Microgaster*. The shining body, smooth abdomen, and colour of the legs are the chief peculiarities. Femora black, the 4 anterior flavo-testaceous at the apex; all the lower trochanters flavo-testaceous; 4 anterior tibiæ flavo-testaceous at both ends, the fore pair inclining to fuscous in the middle; hind tibiæ black, except the base; tarsi infuscated, hind pair darkest. Antennæ longer than the body, setaceous. Entire abdomen smooth and shining, only the 1st segment minutely aciculated; segment 2 not half as long as broad, with two marginal channels somewhat converging in front; 3 about as long as 2. Second cubital areolet triangular, the sides not much incrassated, outer side interrupted as usual near the lower angle.

I captured this insect in a wood near my house at Nunton, Wilts, in 1884.

XII. AGATHIDIDES.

Clypeus entire; mouth closed. Maxillary palpi 5—6, labial 3—4-jointed. Vertex short; occiput excavated. Mesothoracic sutures distinct. Abdomen sessile; sutures distinct. Cubital areolets 2 or 3; in the latter case the 2d is minute, subquadrate or triangular; radial areolet minute, narrow, lanceolate, not nearly reaching the apex of the wing; nervures distinct; recurrent nervure rejected; pobrachial areolet as long as the præbrachial, or longer. Terebra elongate.

This subfamily, comprising the rest of Wesmael's *Aréolaires*, is easily known from the Microgasterides by the small radial areolet, scarcely broader, and not much longer, than the stigma, ending long before the apex of the wing. The number of joints in the antennæ is variable in the species and sexes; the mesothorax trilobate; the 1st abdominal segment with hardly any, or with no, membranaceous edges; the abdomen longer, and in the ♀ not strongly carinated beneath; the valvula ventralis less conspicuous, being flattened against the belly; and the terebra never very short.

The *Agathidides* are somewhat poorly represented in Europe, and especially in Great Britain; but in the equatorial regions, where they supplant the Microgasters, the number of species, rivalling the Bracons in size and colours, in incalculable.

The genus *Agathis* was founded by Latreille in 1805, to include species which have the face triangularly produced. Those without this peculiarity were arranged by Nees v. Esenbeck, in 1814, under his genus *Microdus*.

In 1837 Wesmael divided *Microdus* into two subgenera, *Earinus* and *Therophilus*, characterised by the presence or absence of the nervure dividing the 1st cubital areolet from the prædiscoidal. Förster, in 1862, published the same two divisions as genera, but with new names, *Diatmetus* and *Eumicrodus*.* Reinhard, the latest writer upon this group, has judiciously sanctioned the names *Earinus* and *Microdus*, which are here adopted. In Förster's Synoptical Table we find *Microdus* and its allies erected into a new subfamily, distinct from *Agathis*, which he calls *Eumicrodoidæ*, but which others might prefer to write *Eumicrodontoïdæ*. The alleged ground of separation is nothing but the comparative length or shortness of the face, which in our opinion is not a sufficient reason for the establishment of a subfamily, the rest of the structure in both groups being similar. At this rate *Vipio* must constitute a new subfamily apart from *Bracon*, and our *Apanteles naso* (ante, sp. 43), with two cognate species described by Reinhard, should form another group equal in value to the Microgasterides. Declining to admit this inconsistency, we have regarded *Agathis*, *Microdus* and their allies, as forming one natural subfamily, *Agathidides*. The genus *Orgilus*, Hal. (*Ischius*, Wesm.), was invented for the reception of *Microdus obscurator*, Nees, having only two cubital areolets, and otherwise aberrant; to which have since been added a few more species.

TABLE OF GENERA.

(6) 1. Three cubital areolets in the fore wings.
(3) 2. Face triangularly produced, rostriform .. i. AGATHIS, *Latr.*
(2) 3. Face of the usual form.
(5) 4. First cubital areolet separated by a distinct nervure from the prædiscoidal .. .. ii. EARINUS, *Wesm.*
(4) 5. First cubital areolet not so separated .. iii. MICRODUS, *Nees.*
(1) 6. Two cubital areolets in the fore wings .. iv. ORGILUS, *Hal.*

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* Förster objected to *Microdus* that it had already been used as the name of a genus of fishes, and therefore proposed to call it *Eumicrodus*. According to entomological rules this is not necessary, for the name in ichthyology is *Microdon*, which is not quite the same; and further, *Microdon* (like *Mastodon*, *Megalodon*, and many more) being wrongly formed, should not take precedence over the correctly-spelt *Microdus*.

i. AGATHIS (*Latr.*).

Wesm., Nouv. Mém. Ac. Brux., 1837, p. 23.

Maxillary palpi 5-, labial 4-jointed. Face, maxillæ, and labium produced, rostriform. Mesothorax distinctly trilobate. Mesopleuræ with traces of a longitudinal furrow. Three cubital areolets, the first (as in *Microdus*) confused with the prædiscoidal.

Viewed in front, the head is elongate-triangular, obtusely carinated, with a fovea on each side above the labium; face perpendicular; eyes naked, globose, prominent; occiput obscurely margined. Body elongate. Abdominal segments 1—3 longer than the rest taken together; segment 1 slightly narrowed towards the base, and rugulose; 2 with a deep fovea at each hinder angle, between which foveæ is a gibbous space. Segments 2 and 3 marked with a curved transverse impression, which in the small British species is not very conspicuous. Wings infuscated, with a decolorous streak under the stigma, breaking the continuity of the nervures. The wings being identical with those of *Microdus*, only the form of the head can be used as a divisional character.

The *Agathides* are not common in this country. Only 28 specimens have come to my knowledge belonging to two nearly-allied species, both of which have been bred from Lepidoptera.

TABLE OF SPECIES.

(2) 1.	Abdomen rufous in the middle ..	1. *malvacearum* (Latr.), Nees.
(1) 2.	Abdomen entirely black.	
(4) 3.	Rostrum longer than the head; wings very dark	2. *nigra*, Nees.
(3) 4.	Rostrum not longer than the head; wings lighter.	
(6) 5.	Palpi rufous, black at the base ..	5. *rufipalpis*, Nees.
(5) 6.	Palpi blackish.	
(8) 7.	Areolet quadrangular; terebra as long as the abdomen	4. *brevisetis*, Nees.
(7) 8.	Areolet triangular, subobsolete; terebra as long as the body ..	3. *anglica*, n. s.

1. *Agathis malvacearum* (Latr.), Nees.

Agathis malvacearum, Latr., H. N., xiii., 175; Nees, Mon., i., 137, ♂ ♀.

Ichneumon Panzeri, Jur., Hym., pl. viii., f. 2.

Black, shining; abdomen in the middle, and legs, rufous; coxæ, trochanters, femora at the base, posterior tibiæ at the apex, and tarsi, black. Wings pale at the base, darker at the apex; 2d cubital areolet small, subquadrate. Terebra longer than the body. ♂ ♀ Length, 3½ lin.

Metathorax bicarinated, each carina with a row of punctures on both sides; the space between the carinæ transversely striolated. Segment 1 striato-rugulose at the base; its apical half rufous; segment 2 rufous with the hind margin black. Wings whitish from the base to about the middle, afterwards darker; areolet forming a truncated triangle.

A species of central and southern Europe, but said by Stephens to have been taken by himself in the London district, though no recent captures are recorded. A male and two females are in Walker's collection at Oxford, as I am informed by Westwood, but some proof is required to show that Walker took them in this country.

Giraud bred it in France from *Parasia lappella*, L., and Goureau, in great numbers, from *P. carlinella*, Dougl. (Ann. Soc. Fr., 1858, p. 275).

2. *Agathis nigra*, Nees.

Agathis nigra, Nees, Mon., i., 128; Wesm., Nouv. Mém. Ac. Brux., 1837, p. 23, ♂ ♀; S. v. Voll., Pinac., pl. 29, f. 4, ♀.

Black, with black palpi; anterior femora at the apex broadly, and all the tibiæ, rufo-testaceous; posterior tibiæ tipped with black. Wings fuscous, with a whitish streak below the stigma, which, with the squamulæ and nervures, is black. Antennæ ♂ ♀ 22—24-jointed. Rostrum longer than the head. Head and thorax smooth and shining; mesothorax with a few vague punctures; metathorax uneven, with two longitudinal carinæ and a few transverse lateral wrinkles. Segment 1 with a deep basal fovea, longitudinally convex from thence to the apex, weakly striolated at the base, the rest of the abdomen smooth and shining. Radial areolet longer and more acute than that of *A. anglica*; 2d abscissa of the radius obsolete; 3d abscissa straight; 2d cubital areolet triangular, petiolated, sometimes irregular or obsolete. Terebra ⅓ longer than the body. ♂ ♀. Length, 2; wings, 3¾ lin.

Distinguished from other species by the longer rostrum, and intense colour of the wings. Coxæ and trochanters black; 4 posterior femora in British examples concolorous; in two cases the hind tibiæ bear vestiges of a dusky ring near the base; intermediate tibiæ also black at the tips. The 2d cubital areolet is very irregular.

Rare; but eleven specimens, five males and six females, have fortunately been bred by Elisha from *Eupœcilia roseana*, Haw., August 18th.

3. *Agathis anglica*, n. s.

Ater, femorum anteriorum apice late, tibiisque, testaceis, posterioribus apice fuscis, ante basin obsolete fusco annulatis, tarsis fuscis. Alæ infuscatæ, squamulis, stigmate, nervis, nigricantibus. Antennæ ♂ ♀ 29—31-articulatæ. Rostrum quam *A. nigræ* multo brevius. Caput, mesothorax, scutellum, lævia, nitida; metathorax subrugulosus, feminæ nonnihil lævior, carinis 2 longitudinalibus approximatis, postice divergentibus. Segmentum 1mum ut in sp. præcedente conformatum, sed basi læve, alioquin aciculatum; cætera lævia, nitida; segmentum 2 ut in sp. præcedente. Areola radialis minuta, stigmate minor; radii abscissa 2da obsoleta, 3tia nonnihil curvata, introrsum concava; areola cubitalis 2da tenuissima, fere obsoleta, subtriangularis. Terebra corpori longitudine æqualis.

So like the preceding that it will suffice to point out the differences. Posterior tibiæ with a dusky ring before the base; wings less deeply tinted; antennæ with more joints; rostrum much shorter; segment 1 smooth at the base, aciculated behind; radial areolet shorter, 3d abscissa of the radius curved; areolet not petiolated; terebra not longer than the body. ♂ ♀. Length, 1⅔; wings, 3¼ lin.

Commoner than *A. nigra*; I have taken several specimens, though only one male and two females now remain, captured at Milford Haven. W. H. B. Fletcher has bred a ♀ from *Coleophora albitarsella*, Zell., or *discordella*, Zell., and a ♂ from *Depressaria nervosa*, Haw.

4. *Agathis brevisetis*, Nees. (Pl. VI., figs. 3, 3 *a*).

Agathis breviseta, Nees, Mon., i., 131, ♂ ♀; Wesm., Nouv. Mém. Ac. Brux., 1837, p. 25, ♀; S. v. Voll., Pinac., pl., 29, f. 5, ♀.

Black; anterior femora at the apex broadly, and tibiæ, testaceous, posterior tipped with black and with a black ring before the base; tarsi black, testaceous at the base. Wings infuscated, squamulæ, stigma, and nervures blackish. Antennæ ♂ ♀ 27—32-jointed. Head, mesothorax, and scutellum smooth and shining; metathorax subrugulose, with 2 smooth discal spaces, sometimes obsolete, between which are 2 faint carinæ, somewhat diverging hindwards. Segment 1 with a smooth basal excavation, the rest aciculated; the other segments smooth and shining. Radial areolet broader and longer than in the preceding; 2d abscissa of the radius not quite obsolete, punctiform, being the upper side of the subquadrate areolet. Terebra as long as the abdomen. ♂ ♀. Length, 2; wings, 3½ lin.

Distinguishable from the last only by the shorter terebra, and a small difference in the wings. Third abscissa of the radius straight; 2d cubital areolet quadrangular, narrowed towards the stigma; radial areolet larger. It is also very like *Microdus cingulipes*, Nees, but, besides the generic distinction, the latter may be known by having the areolet stirrup-shaped and petiolated, and the hind tibiæ whitish.

W. H. B. Fletcher bred a ♂ from *Euchromia mygindana*, Schiff., June 18th; Snellen three males in July from *Chrosis rutilana*, Hüb.; Brischke, from *Cleodora striatella*, Hüb.; Bouché, from *Pyrausta purpuralis*, L., according to Ratzeburg. Three males were taken by me, and two males and three females by Bignell, in Devonshire; three females in Scotland, by Cameron.

5. *Agathis rufipalpis*, Nees.

Agathis rufipalpis, Nees, Mon., i., 129; Wesm., Nouv. Mém. Ac. Brux., 1837, p. 24, ♂ ♀.

Black, shining; maxillary palpi, except the base, and legs partly, rufous. Wings fuscous; areolet subsessile. Segment 1 striolated. Terebra longer than the body. ♂ ♀. Length, 2 lin.

First joint of maxillary palpi wholly, and 2d at the base, black; labial brownish black. Abdomen subrugulose at the base, not carinated. Legs variable; fore pair testaceous, their trochanters, and femora beneath at the base, black, their tarsi (and those of the middle pair) fuscous, the 1st joint testaceous; middle legs black, their femora at the apex, and their tibiæ, testaceous; hind legs black, tibiæ testaceous, the apex black.

I have seen but one of this species, which Curtis (Guide, 2d ed., column 116) reported to be British, and in his collection. Taken originally by Nees at Sickershausen, and by Bonelli in Italy. Bred by Brischke from *Nannodia Hermannella*, Fab. Elisha reared one ♀ from the same victim, July 6th.

ii. Earinus, *Wesm.*

Wesm., Nouv. Mém. Ac. Brux., 1837, p. 8.

Maxillary palpi 5-, labial 3-jointed. Face not produced or rostriform. Mesothorax obsoletely trilobate. Mesopleuræ without a furrow. Three cubital areolets, the 1st separated from the prædiscoidal.

To this genus belong a few rather large species with hyaline wings. The nervure separating the 1st cubital from the prædiscoidal is largely interrupted. According to Reinhard the mesothorax is not trilobate; nevertheless the sutures are always slightly indicated.

Table of Species.

(2)	1.	Mesothorax rufous	3. *nitidulus*, Nees, var.
(1)	2.	Mesothorax black.	
(4)	3.	Second abdominal segment rufous ..	2. *zonatus*, n. s.
(3)	4.	Second abdominal segment black.	
(8)	5.	Hind coxæ rufous.	
(7)	6.	Hind tibiæ rufous, white at the base; terebra as long as the abdomen ..	3. *nitidulus*, Nees.
(6)	7.	Hind tibiæ whitish, the tips and a basal ring fuscous; terebra as long as the thorax and abdomen ..	1. *gloriatorius*, Panz., var.
(5)	8.	Hind coxæ black	1. *gloriatorius*, Panz.

1. *Earinus gloriatorius*, Panz. (Pl. VI., fig. 4).

Bassus gloriatorius, Panz., F. G., cii., 17, ♂ (1809).
Microdus gloriator, Nees, Mag. Ges. Berl., 1814, p. 188; Mon., i., 145, ♂.
M. (*Earinus*) *affinis*, Wesm., Nouv. Mém. Ac. Brux., 1837, p. 11; *delusor*, Wesm., *lib. cit.*, p. 12 (var. with rufous coxæ and trochanters), ♂ ♀; S. v. Voll., Pinac., pl. 29, f. 7, 7 *a*, 7 *b* (details of head, thorax, and hind leg).

Black; palpi yellowish; legs rufo-testaceous, hind tibiæ yellow, their tips, a spot or ring near the base, and all the tarsi, fuscous; coxæ usually black, sometimes rufo-testaceous. Wings hyaline, squamulæ and base of the nervures testaceous, the rest and the stigma rufo-fuscous. Body shining, thinly beset with white hairs, those on the head and thorax blackish. Antennæ ♂ ♀ 31—35-jointed. Labial palpi 3-jointed. Head and mesothorax with minute scattered punctures; sutures of the latter just visible, converging posteriorly into a smooth fovea before the scutellum, which is also smooth; metathorax almost smooth, margined, bicarinated, the apical angles somewhat produced. Segment 1 striolated, with 2 carinæ vanishing before the apex; basal fovea large, oblong, smooth; segment 2 more or less striolated in the transverse depression. Terebra as long as the body without the head. ♂ ♀ Length, $2\frac{1}{4}$; wings, 5 lin.

The sexes are similar; the antennæ of the ♂ have only 2—3 more joints than those of the ♀. Segments 1—2 are always more or less aciculated, never quite smooth. Wesmael's *delusor* is certainly not distinct; I have taken it commonly with the others at the same time and place.

Common in Devonshire; taken by Bignell and myself near Plymouth and Teignmouth; also in numbers on the banks of the Usk at Abergavenny, in May and June; by Bridgman at Norwich, and Fitch at Maldon.

2. *Earinus zonatus*, n. s.

Niger, ore, palpis, flagelli dimidio basali, macula pone oculos orbitali, abdominis segmento 2do, pedibusque totis, rufo-testaceis. Alæ leviter infumatæ, squamulis rufo-testaceis, nervis, stigmate, fuscis. Antennæ maris 32-articulatæ. Metathorax transversim rugosus, carinis 2 basi et apice junctis medio divergentibus instructus. Mesopleuræ nitidæ, punctulatæ, fovea crenata nulla. Segmentum 1mum striolatum, basi excavatum; cætera lævia nitida. Areola cubitalis 1ma a prædiscoidali nervo distinctissimo sejuncta; cubitalis 2da triquetra, petiolata, incompleta.

Black; mouth, palpi, basal half of the flagellum, an orbital spot behind the eyes, 2d abdominal segment, and legs entirely, with coxæ and tarsi, rufo-testaceous. Wings slightly infumated, squamulæ rufo-testaceous, nervures and stigma fuscous. Antennæ ♂ 32-jointed. Metathorax transversely rugose, with two carinæ diverging in the middle, united at each end. Mesopleuræ shining, punctulate, without a crenate fovea. Segment 1 striolated, excavated at the base; the rest smooth and shining. First cubital areolet very distinctly separated from the prædiscoidal; 2d petiolated, imperfect. ♂. Length, $1\frac{3}{4}$; wings, $3\frac{8}{9}$ lin.

Described from two specimens in Fitch's collection. Their mesothorax is damaged by pins, but the trilobed structure is discernible, imperfect and effaced in front. The legs are entirely rufo-testaceous, only the claws dusky. The 2d segment is rufo-testaceous, transversely bisected by an impressed line, fainter in the middle.

Bred from *Eupœcilia notulana*, Zell.

3. *Earinus nitidulus*, Nees.

Microdus nitidulus, Nees, Mon., i., 144; *M.* (*Earinus*) *nitidulus*, Wesm., Nouv. Mém. Ac. Brux., 1837, p. 8, pl. (wing), ♂ ♀.

Var. *M. thoracicus*, Nees, Mon., i., 143, ♀; *M.* (*Earinus*) *thoracicus*, Wesm., *lib. cit.*, p. 9, ♀ (mesothorax rufous); S. v. Voll., Pinac., pl. 29, f. 6, ♀.

Black; palpi testaceous; legs rufous, hind tibiæ broadly whitish at the base, tarsi black. Wings hyaline, squamulæ testaceous, stigma blackish; 3d abscissa of the radius sinuated. Antennæ ♂ ♀ 36—37-jointed. Head and thorax beset with whitish pubescence; mesothorax finely punctulate, the sutures faintly traced; metathorax with 2 carinæ, which diverge near the base and thence run parallel to each other to the apex; between them sometimes is a third imperfect carina. Abdomen smooth, shining; segment 1 tricarinated, the middle carina not touching the base. Terebra as long as the abdomen. ♂ ♀. Length, 3 lin.

Unknown to me; the only authority for its occurrence in England is Cur., Guide, 2d ed., column 116. Brischke describes the cocoon as "6 mm. long, 2 mm. broad, almost cylindrical, moderately hard, white, somewhat rough"; there is such a specimen in the Ruthian collection.

iii. MICRODUS, *Nees*.

Nees, Act. Ac. L. C., 1818, p. 304; Reinh., Berl. ent. Zeit., 1867, p. 351.

Maxillary palpi 5-, labial 4- or 3-jointed. Face not produced or rostriform. Mesothorax more distinctly trilobate. Mesopleuræ with a rugulose furrow. Three cubital areolets, the 1st confused with the prædiscoidal.

The only available character for distinguishing this genus from the preceding is the absence, or rather the incompleteness, of the nervure which divides the 1st cubital areolet from the prædiscoidal. As all writers since Wesmael are agreed to sanction this principle, it is here admitted. Nevertheless the character is of no more than sectional or specific value, and begins already to lead to inconvenient results. I am acquainted with one species which is technically excluded from *Earinus* by its distinct mesothoracic sutures, and equally from *Microdus* because it exhibits the dividing nervure.

TABLE OF SPECIES.

(12)	1.	Second abdominal segment smooth, or with only some faint rugulosity at the base of the curved transverse impression.	
(3)	2.	Mesothorax rufous	5. *calculator*, var.
(2)	3.	Mesothorax black.	
(5)	4.	Hind coxæ rufous	3. *tumidulus*, var.
(4)	5.	Hind coxæ black.	
(11)	6.	Hind tibiæ rufous, their apex fuscous.	
(8)	7.	Segment 2 more or less testaceous; (length, 3 lines)	1. *linguarius*, Nees.
(7)	8.	Segment 2 entirely black.	
(10)	9.	Orbits and squamulæ black; length, 3 lines	2. *Clausthalianus*, Ratz.
(9)	10.	Orbits partly, squamulæ wholly, rufous; length, 2¼ lines	3. *tumidulus*, Nees.
(6)	11.	Hind tibiæ white and black	4. *cingulipes*, Nees.
(1)	12.	Second abdominal segment wholly or partially striolated.	
(16)	13.	Third segment entirely smooth.	
(15)	14.	Mesothorax rufous	5. *calculator*, Panz.
(14)	15.	Mesothorax black	6. *brevicaudis*, Reinh.
(13)	16.	Third segment with one half at least rugulose.	
(18)	17.	Hind coxæ rufous; sometimes black at the base	7. *rufipes*, Nees.
(17)	18.	Hind coxæ black.	
(20)	19.	Hind tibiæ half white, half black	8. *rugulosus*, Nees.
(19)	20.	Hind tibiæ rufous, their apex black	9. *mediator*, Nees.

1. *Microdus linguarius*, Nees.

Microdus linguarius, Nees, Mon., i., 149; Reinh., Berl. ent. Zeit., 1867, p. 149, ♂ ♀.

Black, shining; palpi black; legs rufo-testaceous, coxæ and trochanters black, hind tibiæ sometimes, and tarsi always, fuscous at the apex; segment 2 rufo-testaceous at the sides and above, where there is a more or less extended, isolated, black patch. Wings rufo-fuscescent, squamulæ black, nervures and stigma fuscous. Face triangular, subproduced. Antennæ 27—30-jointed. Mesopleuræ subrugulose beneath, with a crenulate fovea. Metathorax reticulato-rugulose, with 2 approximate carinæ, diverging in the middle. Segment 1 striolated, depressed at the base, where the margins are obtusely raised, emitting 2 faint carinæ, which are effaced before the middle; gibbous posteriorly; the other segments smooth and shining. Nervure between the 1st cubital areolet and the prædiscoidal widely interrupted. Terebra longer than the body, or thrice the length of the abdomen. ♂ ♀. Length, ♂ 2, ♀ 3; wings, 4—5½ lin.

Described from one male and two females. The male differs in having the 2d segment entirely black above; the antennæ are 27-jointed. Those of the females are 29- and 30-jointed respectively. In one the 2d segment is margined with black posteriorly. Belly pale at the base. Second cubital areolet triangular, petiolated. The species is next in size to *Clausthalianus.*

I captured the ♂ at Milford Haven, and one ♀ near St. Albans; the other is of unknown origin. Nees v. Esenbeck records a pair taken by him at Sickershausen.

2. *Microdus Clausthalianus*, Ratz.

Microdus Clausthalianus, Ratz., Ichn. d. Forst., i., 58, pl. vii., f. 12, ♀; Reinh., Berl. ent. Zeit., 1867, p. 354, ♂ ♀.

Black; mandibles, palpi. and legs, rufo-testaceous, including the trochanters; coxæ black, the anterior sometimes pitchy beneath; hind tibiæ at the tips, and their tarsi, fuscous. Wings infumated, squamulæ black, nervures and stigma fuscous. Antennæ ♂ ♀ 35-jointed, rather longer than the body. Mesopleuræ smooth and shining, rugulose only in front, and beneath the crenulate fovea. Metathorax reticulato-rugulose, with vestiges of the usual carinæ; evenly convex, and not, as in *tumidulus*, gibbous behind the middle. Segment 1 striolated; 2 with a medial, transverse, arcuate, impressed line, smooth and shining, like the remaining segments. Terebra as long as the body; its valves setaceous. ♂ ♀. Length, 3; wings, 5½ lin.

Three males and five females are in Fitch's collection. The species looks like a large *tumidulus*; but the squamulæ are black instead of rufous, the palpi wholly pale, the orbits without a rufous spot; the antennæ have a few more joints, and the metathorax is differently shaped; but the last character is difficult to seize. Ratzeburg describes it as 3 lines long, which is correct, but his fig. represents it 2½ lines, or nearly the size of *tumidulus*, raising a doubt whether the real *Clausthalianus* has been used for the illustration. The rufous orbits of *tumidulus* are not a constant character, and probably the size of this species and the colour of the squamulæ are the only real means of discrimination.

Two males and three females were bred singly from

Semasia rufillana, Wilk., in July; and another pair from *Depressaria scopariella*, Hein. Also a ♀ by W. Bennett from *Ephippiophora scutulana* (i. e., either *cirsiana*, Zell., or *Pflugiana*, Haw.). Ratzeburg records that several females were reared by Saxesen from *Tortrix hercyniana*, Tr., in the Harz mountains. Cocoon 5 lines long, resembling tissue-paper.

3. *Microdus tumidulus*, Nees. (Pl. VI., fig. 5).

Microdus tumidulus, Nees, Mon., i., 147; Wesm., Nouv. Mém. Ac. Brux., 1837, p. 16, pl. (wing); Reinh., Berl. ent. Zeit., 1867, p. 354, ♂ ♀.

Black; maxillary palpi dusky, or pale with the basal joint dusky; labial dusky with the apical joint pale; a spot on the posterior orbits, and the legs, rufo-testaceous; coxæ, upper trochanters, hind tibiæ at the apex, and their tarsi, black; sometimes the hind tibiæ are obsoletely ringed with dusky near the base. Wings infuscated, squamulæ testaceous or pitchy, nervures and stigma fuscous. Antennæ ♂ ♀ 28—30-jointed. Metathorax somewhat gibbous behind the middle, and sloping thence abruply to the apex, rugulose, with 2 carinæ diverging in the middle and enclosing an ovate space. The rest as in the preceding species. Terebra as long as the body. ♂ ♀. Length, 1½—2¼; wings, 2¾—4¼ lin.

Var. 1, ♀. Hind coxæ rufo-testaceous.

Var. 2, ♂ ♀. Orbits entirely black.

Five specimens, two males and three females, taken near St. Albans; and one male bred by W. H. B. Fletcher, of Worthing, from *Ptocheuusa inopella*, Zell.; the last belongs to var. 2. According to Reinhard bred once by Möschler from *pupa* (?) of *Phthoroblastis acuminatana*, Ill., which feeds on *Chrysanthemum leucanthemum*.

4. *Microdus cingulipes*, Nees.

Microdus cingulipes, Nees, Mon., i., 148, ♀; Wesm., Nouv. Mém. Ac. Brux., 1837, p. 18; Reinh., Berl. ent. Zeit., 1867, p. 354, ♂ ♀.

Black; palpi dusky, hardly paler at the apex; 4 anterior femora at the apex, and their tibiæ, rufo-testaceous; hind tibiæ white, the apex, and a ring near the base, blackish; hind tarsi white at the base; the other tarsi darkened towards the last joint, which is black. Wings slightly infuscated, squamulæ black, nervures and stigma fuscous. Antennæ ♂ ♀ 30—31-jointed. Metathorax rugulose, with 2 more or less obsolete carinæ, effaced before the apex, enclosing a somewhat raised area. Second segment smooth, with a transverse impression; the following segments also smooth and shining. Second cubital areolet petiolated, stirrup-shaped. Terebra as long as the body. ♂ ♀. Length, 2; wings, $3\frac{2}{3}$ lin.

Extremely like the preceding, but, besides the colour of the legs, it may be known by the radial areolet, contracted into a mere line, the curved radius following the contour of the stigma; the areolet is more distinctly petiolated; the squamulæ black; the body shorter and broader; and the 1st abdominal segment rather narrower at the base.

Common; generally found on Umbelliferæ. Two females are in Fitch's collection; and I took a pair at Niton, Isle of Wight, in 1884; several specimens formerly in my collection have perished.

According to Giraud bred by Fallou from *Eupithecia helveticaria*, Boisd., found feeding upon juniper at Fontainebleau.

5. *Microdus calculator*, Fab.

Ichneumon calculator, Fab., E. S., Suppl., 225; *calculatorius*, Panz., F. G., lxxxiii., 13, ♀.

Bassus calculator, Fab., Piez., 98; Cur., B. E., pl. lxxiii., ♂.

Microdus calculator, Nees, Mon., i., 144; Reinh., Berl. ent. Zeit., 1867, p. 355, ♂ ♀.

M. abscissus, Ratz., Ichn. d. Forst., i., 58; ii., 46, pl. ii., f. 22; iii., 45.

Black; mandibles, palpi, mesothorax, anterior pleuræ, fore and middle legs, rufo-testaceous; coxæ black (anterior coxæ of the ♂ rufo-testaceous); hind legs black, their femora tipped with rufous and the base of their tibiæ dirty white. Wings only slightly infumated, iridescent, with the usual hyaline streak, stigma and nervures fuscous. Metathorax rugose. Segments 1—2 striolated, 2 with a transverse impressed line, the apex and the remaining segments smooth and shining. Terebra as long as the thorax and abdomen. ♂ ♀, Length, $2\frac{3}{4}$—3 lin.

A typical species, the wings having no vestige of the nervure dividing the 1st cubital areolet from the præ-discoidal. Ratzeburg says the antennæ of the ♂ are shorter than the body, but they are not so represented by Curtis. Belly whitish at the base, and cariniform throughout its length. Segment 1 narrowly edged with pale colour at the sides and apex.

This species seems to have been found in England only by Curtis, and no recent specimens are forthcoming. The locality named is the New Forest, about a mile to the north of Lyndhurst, where early in September, 1822, Curtis captured both sexes alighting on the flat stump of a felled tree. Others have been taken in central Europe and Italy. The ♂ was bred by Ratzeburg from buds of pine-tree occupied by *Pissodes notatus*, Fab., at Borutin, in Upper Silesia. The ♀ by Tischbein from *Orchesia micans*, Panz. By Giraud also from a *Boletus* with *Scardia boleti*, Fab., and *Tinea parasitella*, Hüb. By Schönbach from galls of the beech-tree.

6. *Microdus brevicaudis*, Reinh.

Microdus brevicaudis, Reinh., Berl. ent. Zeit., 1867, p. 356, ♀.

♀. Black; palpi at the apex testaceous; anterior femora at the apex, and their tibiæ, rufo-testaceous, hind tibiæ whitish, fuscous at the tips and below the base. Wings infumated. Antennæ 29-jointed. Mesothorax distinctly trilobate. Mesopleuræ shining, impressed with a crenate furrow. Segments 1—2 rugulose; 2 at the apex, and all the following segments, smooth. Terebra a little longer than ½ the abdomen. Areolet sessile, subquadrate, Length, 1⅔ lin.

The 1st segment is longitudinally rugose, the rugulosity of the 2d is very fine, consisting of transverse curved lines, concave anteriorly. Hind tarsi blackish brown, whitish at the base.

The above is Reinhard's description of the ♀, which I have not seen. The following is very likely to be the ♂, but from the nature of the case there can be no certainty:—

♂. Palpi black; hind tibiæ the same colour as the others, fuscous at the tips and below the base. Antennæ 29-jointed. Second segment with a triangular striolated discal patch, the apex of which reaches the hind margin; the sides smooth; striæ somewhat sinuated, but not transverse, nor concave anteriorly. In other respects the specimen agrees with Reinhard's description, and, according to his table, it is *brevicaudis*.

Reinhard does not say much about the wings. Those of the ♂ have the 1st cubital areolet divided from the prædiscoidal by a visible nervure, contrary to the law of the genus *Microdus*; while the trilobate structure of the mesothorax excludes the species from *Earinus*.

The specimen is in Fitch's collection, and was bred, July 24th, from the larva-case of *Coleophora troglodytella*, Dup., at Guestling, near Hastings.

7. *Microdus rufipes*, Nees.

Microdus rufipes, Nees, Mon., i., 146; Wesm., Nouv. Mém. Ac. Brux., 1837, p. 15; Ratz., Ichn. d. Forst., ii., 47; Reinh., Berl. ent. Zeit., 1867, p. 356, ♂ ♀.

Black; palpi dull testaceous; legs, including the coxæ, rufo-testaceous; posterior, or only the hind tibiæ, and their tarsi, tipped with fuscous. Wings slightly infumated, squamulæ subtestaceous, or pitchy, nervures and stigma fuscous. Antennæ ♂ ♀ 32—34-jointed. Mesothorax deeply trilobate. Metathorax rugose, with a medial carina not reaching the hind margin. Mesopleuræ with a crenate fovea. Segments 1—2, and half of 3, striolated; 2 with a curved, and 3 with a straight, transverse impressed line. Second cubital areolet stirrup-shaped, shortly petiolated; nervure separating the 1st cubital areolet from the prædiscoidal inchoate at both ends. Terebra as long as the body without the head. ♂ ♀. Length, 2—2½; wings, 4—4¾ lin.

Var. Anterior half of the 2d abdominal segment rufous.

The 2d segment in some specimens is pitchy, or subferruginous; in one ♂ the hind coxæ are black at the base. But the general colour of the legs, together with the extended rugulosity of the abdomen, are good characters by which to determine the species. According to Nees all the tibiæ are tipped with fuscous, and the terebra is as long as the body; hence Wesmael doubts whether his own *rufipes* is the same; but such discrepancies are not of much consequence.

Four males and two females from Darenth Wood, and a male bred by Elisha, July 31st, from *Coleophora gryphipennella*, Bouché. Giraud also bred it from a *Coleophora*, and Goossens from *Pardia tripunctana*, Fab. According to Ratzeburg, Bouché reared male and female from *Hedya ocellana*, Fab.; and again from *Andricus terminalis*, Fab., in which several lepidopterous larvæ are to be found.

8. *Microdus rugulosus*, Nees.

Microdus rugulosus, Nees, Mon., i., 148, ♀; Reinh., Berl. ent. Zeit., 1867, p. 357, ♂ ♀.

Black; palpi fuscous, the maxillary rufous at the tips; anterior femora and tibiæ rufous; basal half of hind tibiæ white with a fuscous ring, the other half black; spurs white; hind tarsi black, white at the extreme base. Wings infumated. Segments 1—3 punctulato-rugulose, 2—3 in the middle transversely impressed; the other segments smooth and shining. Second cubital areolet sessile. Terebra as long as the body without the head. ♂ ♀. Length, 2 lin.

Var. Anterior coxæ and hind femora rufous, the latter tipped with black; segment 2 rufescent at the base.

Introduced as British on the authority of Curtis, Guide, 2d ed., column 116; no specimens being at hand. The description is from Nees and Reinhard. According to Nees it differs from *cingulipes* in the rugulosity of the abdomen, and the form of the 2d cubital areolet. Segment 1 rimuloso-striate; 2—3 punctulato-rugulose and dull, each with a straight transverse medial depression; 3 on the hind margin, and all the following, smooth and shining. Reinhard says the terebra is as long as the body. Coxæ and upper trochanters black, the lower rufous. Anterior legs rufous, their femora narrowly black at the base.

One ♀ was taken by Nees v. Esenbeck at Sickershausen. Subsequently, according to Reinhard, obtained at Hambach by Eichhoff, in July, from bark at the roots of oaks, together with *Bostrychus villosus*, Fab.; and by Von Heyden from rotten wood in forests, and on the trunks of oaks.

9. *Microdus mediator*, Nees.

Microdus mediator, Nees, Mon., i., 146; Reinh., Berl. ent. Zeit., 1867, p. 357, ♀.

Black; palpi concolorous; femora and tibiæ rufo-testaceous, hind tibiæ with a ring near the base, and the apex, blackish; tarsi fuscous. Wings infumated, squamulæ black, nervures and stigma fuscous. Antennæ 29-jointed. Metathorax finely reticulato-rugulose, with 2 longitudinal carinæ. Segment 1 rugulose, 2, and 3 at the base, minutely rimulose, more punctulate at the sides; the rest smooth and shining; segment 2 distinctly shorter than broad, and with a medial transverse depression, more faintly repeated on the

3d. Second cubital areolet sessile, quadrangular. Terebra as long as the abdomen. ♀. Length, 2¼ lin. The British specimen is only 1½ lin. long; wings, 3 lin.

Distinguished by the shortness of the terebra and of the 2d segment. In the British specimen the femora are narrowly infuscated at the base; the intermediate tibiæ, as well as the hind pair, are infuscated at the tips, and faintly annulated below the base with the same colour.

One ♀ taken at Maldon by Fitch, August 11th.

iv. ORGILUS, *Hal.*

Hal., Ent. Mag., i., 262; iii., 143; Reinh., Berl. ent. Zeit., 1865, p. 260.

Maxillary palpi 6-, labial 4-jointed. Face not produced or rostriform. Mesothorax trilobate. Mesopleuræ with a crenulate furrow. Two cubital areolets, the 1st distinct from the prædiscoidal.

Form narrow, linear. Head scarcely as wide as the thorax; occiput distinctly margined; face with 2 deep foveæ above the clypeus. Wings short, narrow; stigma lanceolate, not bulging beyond the costa; radial areolet narrow, cuneiform, yet broader than in the preceding three genera, ending much before the apex of the wing; radial originating beyond the middle of the stigma; 1st intercubital nervure oblique, almost in a line with the 3d abscissa of the radius. Hind coxæ, spurs of the hind tibiæ, and terebra, elongate; the coxæ also incrassated.

In the 'Magazin der Gesellschaft naturf. Freunde zu Berlin,' Nees v. Esenbeck, in 1814, described four species of this genus, forming Section II. of his *Microdus*, viz., *M. punctulator*, *lævigator*, *obscurator*, and *annulator*. These he repeated in his Monograph in 1834, with the addition of another species, *rugosus*, which he inconsistently placed under *Microgaster*. Haliday, in 1833, established the genus *Orgilus* for *Microdus* Sect. II. of Nees, and in 1835 described the British species *obscurator*, regarding *lævigator* and *annulator* as synonyms. He placed *Orgilus*, on account of the number of joints in the palpi, in the same group as *Zele* and *Macrocentrus*; an arrangement which is supported by the general resemblance of those genera. The affinity of *Orgilus*, however, to the *Agathis-Microdus*-group is much more striking, and those who regard the palpi of Hymenoptera as affording characters of only secondary value, will probably agree with Nees, Wesmael, Ratzeburg, and Förster in considering the genus here rightly placed. Wesmael, in 1837, published it under the name *Ischius*; Hartig in the same year united it with *Eubadizon*; and Ratzeburg (1844—52) distributed the three species known to him under *Ischius, Microdus*, and a new genus named *Macropalpus*. *Orgilus* is fully discussed, and four species described, by Reinhard, *l. c.*

Orgilus obscurator, Nees. (Pl. VI., fig. 6).

Microdus obscurator, Nees, Mon., i., 151; *lævigator*, 150; *annulator*, 152, ♀.

Orgilus obscurator, Hal., Ent. Mag., iii., 145; Reinh., Berl. ent. Zeit., 1865, p. 263, ♂ ♀; S. v. Voll., Pinac., pl. 29, f. 9 (♀ abdomen).

Ischius obscurator, Wesm., Nouv. Mém. Ac. Brux., 1837, p. 21, pl. (wing); Ratz., Ichn. d. Forst., ii., 46, ♂ ♀.

Eubadizon leptocephalus, Hart., Jahresb., 1837, p. 268, ♂ ♀.

Macropalpus leptocephalus, Ratz., Ichn. d. Forst., i., 57, ♂ ♀, pl. vii., f. 9 (with parts of the mouth).

Black, with black palpi; 4 anterior femora at the apex and underneath, and the tibiæ more or less, rufescent. Wings infumated, with a decolorous angulated mark beneath the stigma, which, as well as the nervures, is fuscous. Antennæ 27—33-jointed, of the ♀ as long as the body, of the ♂, longer. Head and thorax hardly shining; mesothoracic sutures shallow. Mesopleuræ, at least above the fovea, smooth. Metathorax rugulose. Segments 1—2 minutely and thickly exarated, dull; the apex of both, and sides of the latter, with the remaining segments, smooth and shining; segment 2 not shorter than its basal breadth. Hind coxæ dull, pubescent. Terebra sometimes as long as the body; usually somewhat shorter. ♂ ♀. Length, 1½—2¼; wings, 2½—3½ lin.

Var. ♂. Antennæ at the base, and 2d abdominal segment at the sides, rufous.

The variations are trifling, and never such as to obscure the species. The wings are more or less dark, and segments 1—2 sometimes nearly smooth.

Not uncommon, especially on sandy coasts; found by Haliday in England and Ireland; by me often at Milford Haven, in the Isle of Wight, and in the Forest Hills, Leicestershire; also at Rannoch; in Corscia, and the

Pyrenees. Bred singly by Elisha and W. H. B. Fletcher from *Coleophora alcyonipennella*, Kol.; by J. Sang from *Lita acuminatella*, Sircom; by Colquhoun from *Coleophora discordella*, Zell.; by W. H. B. Fletcher from *Euchromia mygindana*, Schiff.; *Coleophora niveicostella*, Fisch.; *Laverna miscella*, Schiff., and one undetermined larva; and by Weston from galls of *Cynips Kollari*, Hart., inhabited by various *Tortricidæ* (Entom., 1880, p. 259). According to Reinhard it is most commonly obtained from *Retinia buoliana*, Schiff., and other *Tortricidæ*; Brischke bred it from this host and from *R. resinana*, L.: in the Vienna Museum is a ♀ from *Anacampsis anthyllidella*, Hüb. According to Ratzeburg, bred by Reissig and Heyer from *R. buoliana*; also by Dr. Giraud. At the Hague, according to S. v. Vollenhoven, July 4th, from *Depressaria hypericella* [*i. e.*, either *liturella*, Hüb., or *conterminella*, Zell.], and, July 27th, from a *Coleophora*.

EXPLANATION OF PLATES.

PLATE I.

Fig. 1. *Bracon lævigatus*, Ratz., ♀.
1*a*. ,, *brevicornis*, Wesm., ♀,
1*b*. ,, ,, , wing.
2. *Phanomeris catenator*, Hal., ♀.
3. *Xenarcha lustrator*, Hal., ♂.
4. *Bathystomus funestus*, Hal., ♀.
5. *Rhysipolis meditator*, Hal., ♀.
6. *Rhyssalus indagator*, Hal., ♀.
6*a*. ,, ,, , ♂ leg.

PLATE II.

1. *Colastes decorator*, Hal., ♀.
2. *Oncophanes lanceolator*, Nees, ♀.
3. *Spathius rubidus*, Rossi, ♀.
4. *Hecabolus sulcatus*, Curt., ♀.
4*a*. ,, ,, , ♂ wings.
5. *Dimeris mira*, Ruthe, ♀.
6. *Cœloides scolyticida*, Wesm., ♀.
7. *Doryctes Heydenii*, Reinh., ♀.

PLATE III.

Fig. 1. *Histeromerus mystacinus*, Wesm., ♀.
2. *Chremylus rubiginosus*, Nees, ♀.
3. *Hormius moniliatus*, Nees, ♀.
4. *Clinocentrus exsertor*, Nees, ♀.
5. *Petalodes unicolor*, Wesm., ♀.
6. *Pelecystoma lutea*, Nees, ♀.
6 *a*. ,, ,, , maxillary palpus.

PLATE IV.

1. *Heterogamus dispar*, Curt., ♂.
2. ,, ,, , ♀.
3. *Rhogas irregularis*, Wesm., ♀.
3 *a*. *Zygæna filipendulæ* larva from which *Rhogas bicolor* has emerged.
4. *Allodorus lepidus*, Hal., ♂.
5. *Sigalphus obscurellus*, Nees, ♀.
6. *Phanerotoma dentata*, Panz.

PLATE V.

1. *Chelonus canescens*, Wesm., ♀.
1 *a*. ,, *sulcatus*, Nees, ♂ abdomen.
2. *Ascogaster instabilis*, Wesm., ♂ var.
3. *Sphæropyx irrorator*, Fab.
4. *Mirax spartii*, Hal., ♀.
5. *Acœlius subfasciatus*, Hal., ♂.
6. *Apanteles ferrugineus*, Reinh., ♀
7. *Microplitis xanthopus*, Ruthe, ♀

PLATE VI.

1. *Microgaster russatus*, Hal., ♂.
2. ,, *tiro*, Reinh., ♀.
3. *Agathis brevisetis*, Nees, ♂.
3 *a*. ,, ,, , head.
4. *Earinus gloriatorius*, Panz., ♀.
5. *Microdus tumidulus*, Nees, ♀.
6. *Orgilus obscurator*, Nees, ♀.